EASY POWER, EASY LIFE

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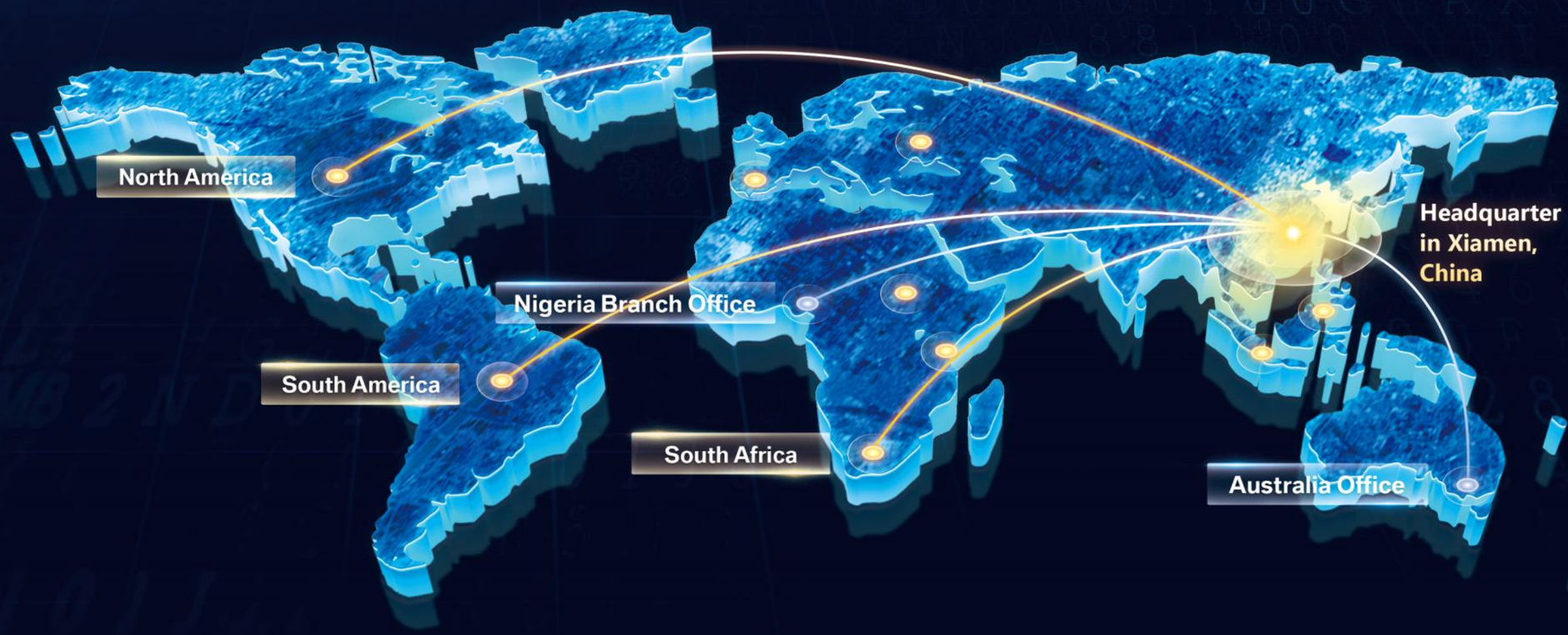
Backup Power, Off Grid, Mini Grid & ESS Expert

Complete Solution Provider

TBB Renewable To Be Best

TBB POWER



· Solution Scope ·

- Off/On Grid
- Mini Grid
- Energy Storage
- Generator Hybrid

3.28 Million Tons Annual Reduced CO2 Emission

3285GWh+ Annual Energy Output

Why Choose TBB Renewable?

Professional Technical Support

Innovation Ability

Years Industry Experience	R&D Staffs	R&D Centers
16+	150+	2
Plants (35,000m² in total)	**Employees**	**R&D Labs**
4	1100+	5
Patents, Copyright	**Installations**	
100+	450,000+	

TBB Renewable

TBB POWER

TBB integrates the latest and most advanced technology and automation solutions, owning the most complete product line in the industry, with reliable quality, high efficiency and stable performance, always giving you peace of mind.

Efficient Production, Operation, Quality Control

Intelligent Manufacturing

Comprehensive and professional test

Lean Production

Automatic integrated production line, automatic SMT production line and automatic and digital quality control and management of manufacturing key sections: online AOI inspection, FCT, ATE, Aging test. R&D tests includes Islanding detection, Salt spray test, etc.

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Complete Power Solution

Committed to providing one-stop power solution, including power generation, power conversion, storage, monitoring & management, cloud and accessories.

Power Generation

Solar Charge Controller
(150V/250V/600V)

Ground Fault Detection

AGS Function

Power Conversion

All-in-one Solar Inverter
(2kVA-8kVA)

Inverter Charger
(2-15kW)

Hybrid Inverter
(3-15kW)

PCS
(33kW)

Storage

Lithium Battery
48V 5.04kWh-10.08kWh

Battery Cabinet

Lithium Battery
576-720V 43.2kWh-216kWh

All-in-one System

Off-grid / ESS

Mini-grid & I&C ESS

Monitoring

Monitor & EMS

Communication Tools

Cloud

Accessories

AC/DC/PV Distribution Box

Tools

Battery Management

Comprehensive Documents Support

Setup Guide

Function Guide

Installation Wiring Diagram

Knowledge Popularization

... ...

Complete Solutions

EASY POWER, EASY LIFE

Application Scenarios →

MORE +

Backup Power with ESS

2kVA-72kVA

Off Grid with ESS

2kW-135kW

Residential Hybrid ESS

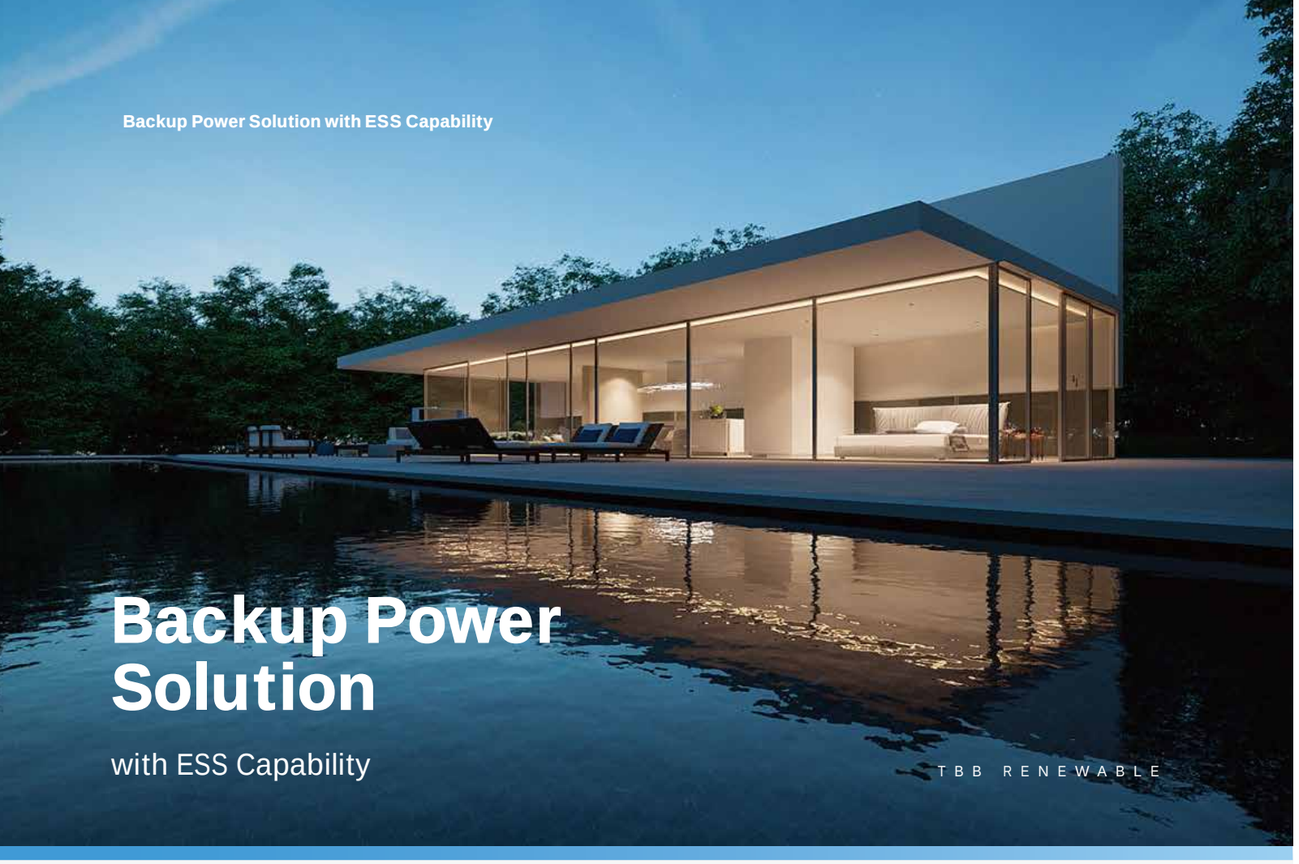
6kW-45kW

Mini Grid

33kW-330kW

Commercial & Industrial ESS

33kW-330kW



Solution Introduction

TBB offers various backup power solutions, ranging from small residential as 2kVA to medium commercial up to 72kVA, capable of working with the grid and PV panels, providing clean and uninterruptible backup power with a longer duration than your traditional UPS system.

RiiO Sun II series is TBB's brand-new versatile all-in-one solar inverter for backup power and basic ESS application. Built-in with MPPT, RiiO Sun II can use solar energy to directly power loads during the daytime and charge the battery for backup use, to guarantee uninterruptible power supply. RiiO Sun II also supports feeding energy back to power loads on the AC input, to maximize self-consumption and reduce system investment. With E4 LCD monitor, it can realize peak shaving to reduce electricity bills.

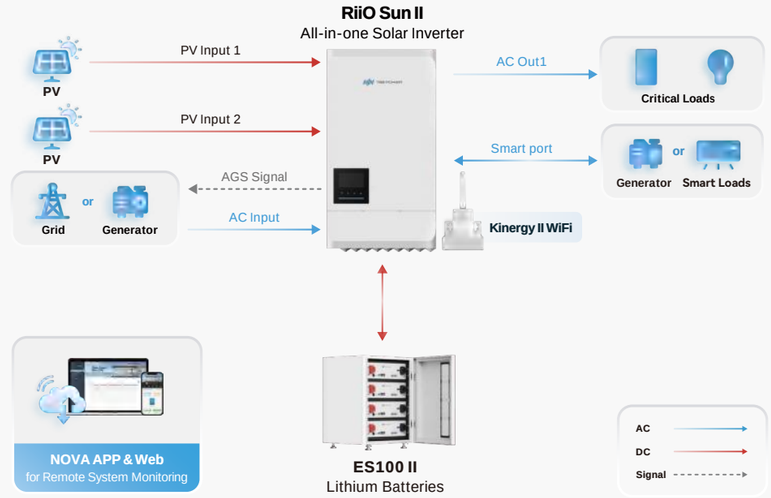
Solution Highlights

- All-in-one design, easier installation, less labor, less cost
- 2 hours ultra fast charging capability for lithium batteries
- Flexible for various applications from 2kVA to 72kVA
- Low frequency transformer-based inverter with high surge capacity for powering heavy loads
- Support parallel and three-phase up to 9 units (RiiO Mate required)
- Ultra-rapid transfer time (2ms), seamless power supply for critical loads
- Maximize self-consumption and realize peak shaving with E4 LCD monitor
- Optional to work without battery
- 2 MPPT trackers for 5kVA, 6kVA and 8kVA models
- A programmable smart port for 5kVA, 6kVA and 8kVA models
- Smart and compact lithium battery with 6000 cycles and 90% DOD, built-in BMS
- Compatible with mainstream lithium battery brands
- Compatible with majority of poor generators in the market
- Support automatically start or stop the generator (AGS function) according to load power, battery voltage/SoC, time period
- Power assist and power control function
- ECO mode optional to prolong backup time
- Remote monitoring and control via NOVA APP & Web
- Local monitoring and EMS via E4 LCD monitor

Basic Backup

System Size: 2kVA-8kVA | Residential

MPPT Charger: up to 5.76kW
Solar Inverter: 2kVA - 8kVA



Main Components

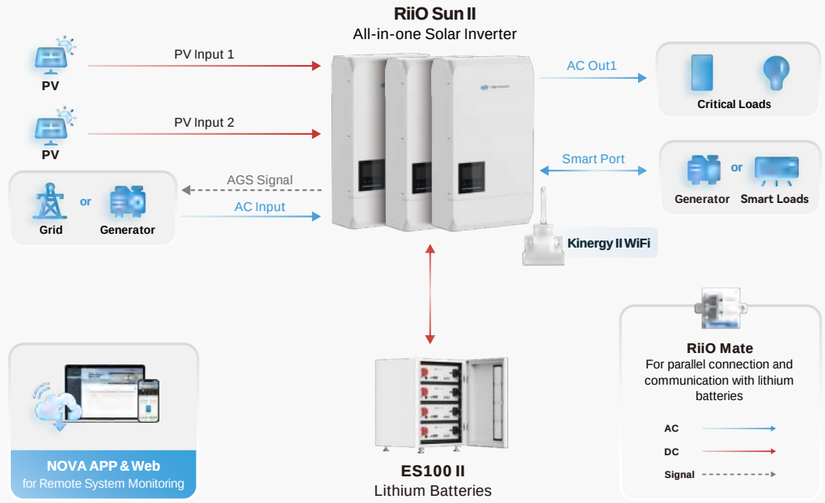
- RiiO Sun II
- ES100 II
- Kinergy II

Single unit application: for small homes with a low household load and unstable or limited grid access, single-unit systems are suitable for providing steady electricity

Advanced Backup

System Size : 2kVA-72kVA | Residential & Commercial

MPPT Charger: up to 51.84kW
Solar Inverter: 2kVA - 72kVA



Main Components

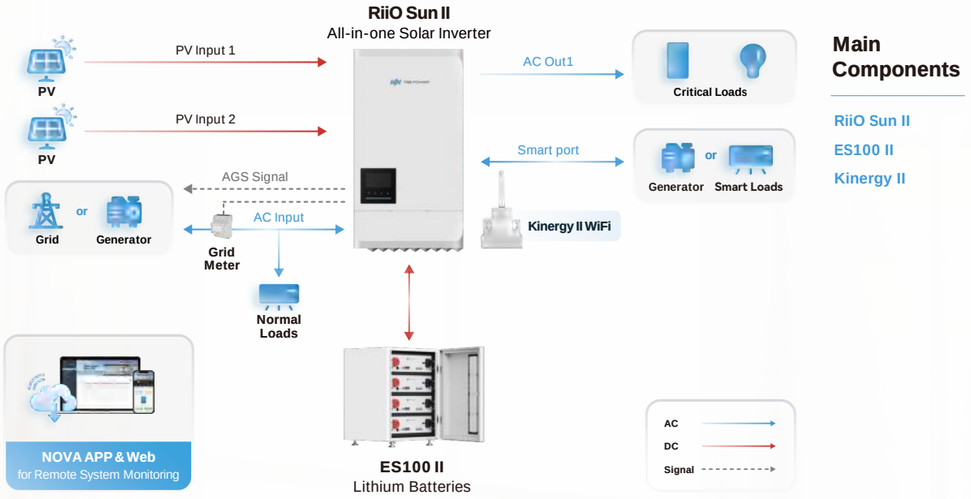
- RiiO Sun II
- ES100 II
- Kinergy II
- RiiO Mate

Multi-units parallel & three-phase application: for large homes requiring three-phase electricity to power heavy loads during grid outages and with unstable or limited grid access.

Backup with ESS

System Size: 2kVA-8kVA | Residential

MPPT Charger: up to 5.76kW
Solar Inverter: 2kVA - 8kVA



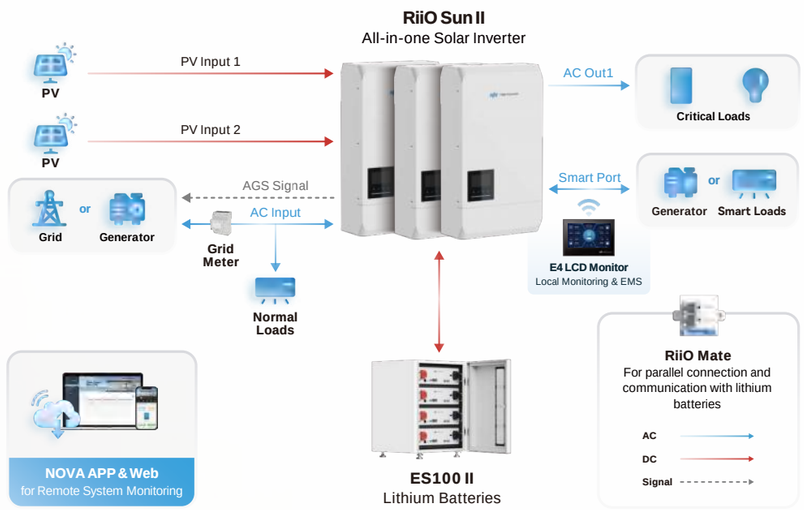
Main Components

- RiiO Sun II
- ES100 II
- Kinergy II

Single unit application: suitable for backup power and basic ESS applications; support feeding energy back to power loads on the AC input to maximize self-consumption, and reduce electricity expense and initial system investment.

System Size : 2kVA-72kVA | Residential & Commercial

MPPT Charger: up to 51.84kW
Solar Inverter: 2kVA - 72kVA



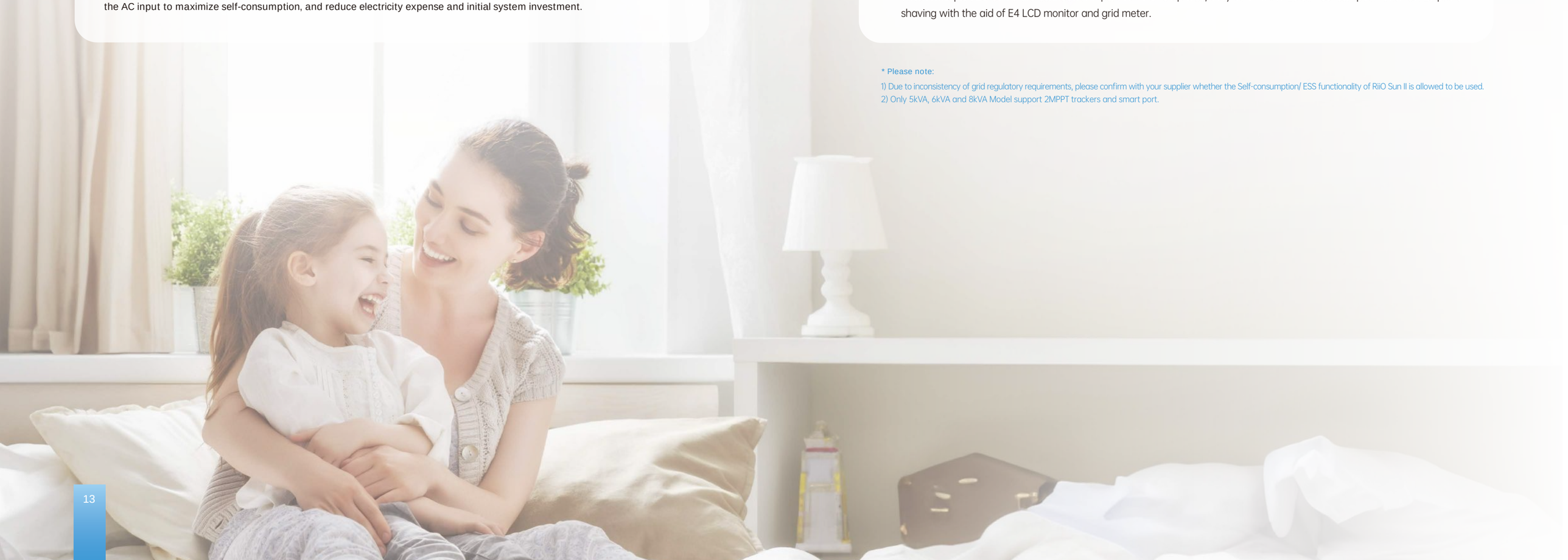
Main Components

- RiiO Sun II
- ES100 II
- E4
- RiiO Mate

When multiple RiiO Sun II are connected in parallel or three-phase, they can maximize self-consumption and realize peak shaving with the aid of E4 LCD monitor and grid meter.

*** Please note:**

1) Due to inconsistency of grid regulatory requirements, please confirm with your supplier whether the Self-consumption/ ESS functionality of RiiO Sun II is allowed to be used.
2) Only 5kVA, 6kVA and 8kVA Model support 2MPPT trackers and smart port.



Available Components

A wide range of products for you to choose >>>

/ Inverter

MORE +

RiiO Sun II Series

All-in-one Solar Inverter

- 2kVA/3kVA/4kVA/5kVA/6kVA/8kVA 230V
- 2kVA/3kVA/4kVA 120V
- 5kVA/8kVA 120/240V Split-phase
- Built-in 2MPPTs for 5kVA/6kVA/8kVA models
- Parallel and three-phase up to 9 units
- Programmable smart port for 5kVA/6kVA/8kVA models
- AGS
- ESS Capability
- Optional to work without battery

/ Battery

MORE +

PS5 Lithium Battery Bank

- 48V 105Ah 5.04kWh
- Parallel up to 32 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

PS10 Lithium Battery Bank

- 48V 210Ah 10.08kWh
- Parallel up to 16 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

ES100 II Lithium Battery

- 48V 105Ah 5.04 kWh
- 6000 cycles, 90% DOD
- Parallel up to 32 units

/ Rack for Battery

MORE +

Simple Mounting Bracket

- For installation of 4xES100 II

Power Rack Cabinet

- IP65
- For installation of 4xES100 II
- Support stack installation

/ Monitoring Device

MORE +

Kinergy II-WiFi

External communication device to transfer the system data to the NOVA APP or Web for system remote monitoring and control

- Support Wi-Fi Protected Setup (WPS)
- Support BLE-config via APP
- Support RiiO Sun II, Kinergier Pro CK-II, Tyrann, Apollo Matrix, Matrix II, and Ingesola

E4 LCD Monitoring

Local Monitoring & EMS

- For system's local control and monitoring
- Support Wi-Fi communication to transfer system data to the NOVA to realize system remote monitoring

Ether Link

- Transmit system data to the NOVA App & Web for system monitoring and control
- Connects to the Internet via cable
- Supports 10M/100M bps Ethernet communication

/ Distribution

MORE +

AC Distribution

DC Distribution

PV BOX

All-in-one Solar Inverter

RiiO Sun II

2kVA / 3kVA / 4kVA / 5kVA / 6kVA / 8kVA

230VAC

Transformer-based
Parallel and three-phase(Up to 72kVA)
Maximize self-consumption
Feeding energy back into grid
Optional to work without battery

- Optional to work without battery (only for single unit application with stable AC bypass supply, PV energy as a supplement for AC bypass)
- Auto restart when the PV or AC is recovering
- Higher PV open circuit voltage
- Higher PV charging power and current
- 2 MPPT trackers for 5kVA, 6kVA and 8kVA models

* Please note: due to the inconsistency of grid regulatory requirements, you need to confirm with your supplier whether the Self-consumption/ ESS functionality of RiiO Sun II is allowed to be used or not.

RiiO Sun II series is TBB's brand-new versatile all-in-one solar inverter for off-grid, ESS and self-consumption applications, combining a pure sine wave inverter, battery charger, MPPT solar charge controller and a high-speed automatic transfer switch in a compact casing with a better display interface design and better human machine interface. Compared with the previous RiiO Sun series, it boasts higher PV open circuit voltage, higher PV charging power and current, and supports parallel and three-phase operation up to 9 units to achieve higher power output (up to 72kVA). It is optional to work without battery and only use solar energy to power loads directly. You can start with the comprehensive system or a smaller solution and gradually expand it, depending on what best suits your needs and budget. A programmable smart port is also equipped in both 5kVA, 6kVA and 8kVA model for generator input or load management.

Worth to mention, that RiiO Sun II supports energy feeding back to power loads on the AC input to maximize self-consumption and cut down system investment. AGS function now is also available for RiiO Sun II. Its power assist and power control function enable it work well with limited AC sources such as generators or limited grid. RiiO Sun II can automatically adjust its charging current by taking loads into account to protect the AC source from overload. Once the temporary peak power appears, it can also discharge the battery in an extremely short time to compensate the insufficient part of the limited AC source.

- All-in-one, plug and play design for easy installation
- Transformer-based, easily withstand the initial surge current
- Versatile for solar off-grid, ESS, self-consumption and backup power system
- Support parallel and three-phase (RiiO Mate required)
- Support energy feeding back into grid
- Maximize self-consumption
- Programmable output relay for generator start and stop
- A programmable smart port for 5kVA, 6kVA and 8kVA models
- Ultra-short transfer time (4ms) for mission-critical loads
- Better display interface design and better human machine interface
- Power assist and power control
- Built-in ECO Mode to prolong the battery backup time
- Compatible with mainstream lithium battery brands
- Max inverter efficiency 94%, max MPPT efficiency 98%
- Extremely low self-consumption power
- Remote monitoring and control via Nova Web & APP
- Fully programmable by APP

Model	RiiO Sun II 2KVA-M	RiiO Sun II 3KVA-M	RiiO Sun II 3KVA-S	RiiO Sun II 4KVA-S	RiiO Sun II 5KVA-S	RiiO Sun II 6KVA-S	RiiO Sun II 8KVA-S
Power Assist	Yes						
AC input range	175~265 VAC (45~65 Hz)						
AC input Current (transfer switch) (A)	32	32	32	32	50	50	50
Inverter							
Nominal battery voltage (V) / Input voltage (V)	24 / 21~34		48 / 42~68				
AC output voltage (VAC)	220/230/240 ± 2%						
AC output Frequency (Hz)	50/60 ± 0.1%						
Harmonic distortion	<2%						
Load Power factor	1.0						
Cont. output power at 25°C (VA)	2000	3000	3000	4000	5000	6000	8000
Max output power at 25°C (W)	2000	3000	3000	4000	5000	6000	8000
Peak power (W)	4000	6000	6000	8000	10000	12000	16000
Surge	300%						
Maximum efficiency	91%	91%	93%	93%	94%	94%	95%
Zero load power (W)	13	17	17	19	22	25	32
Charger							
Charge voltage 'absorption' (V) / 'float' (V)	28.8 / 27.6		57.6 / 55.2				
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium						
Max AC charge current (A)	40	70	35	50	60	70	90
Temperature compensation	Yes						
Solar Charge Controller							
Max output current (A)	80	80	60	60	100	100	100
Maximum PV open circuit voltage (V)	150	150	250	250	250	250	250
MPPT voltage range (V)	40~145	40~145	65~245				
Number of MPPT trackers	1	1	1	1	2	2	2
Maximum PV input current per tracker (A)	36	36	36	36	36 + 36	36 + 36	36 + 36
Maximum PV short circuit current per tracker (A)	40	40	40	40	40 + 40	40 + 40	40 + 40
Maximum PV power per tracker (W)	3600	3600	5200	5200	4400 + 4400	4400 + 4400	4400 + 4400
Charge voltage 'absorption' (V) / 'float' (V)	28.8 / 27.6		57.6 / 55.2				
MPPT charger maximum efficiency	98%						
MPPT efficiency	>99.5%						
Protection	a) output short circuit; b) overload; c) battery voltage too high; d) battery voltage too low; e) temperature too high; f) input voltage out of range						
General data							
AC Out1 Current (A)	32	32	32	32	50	50	50
Smart Port Current (A)	N/A				50		
Transfer time	4ms (<15ms in Weak AC source Mode)						
Protection	a) output short circuit; b) overload; c) battery voltage too high; d) battery voltage too low; e) temperature too high; f) input voltage out of range; g) input voltage ripple too high; h) Fan block						
General purpose com. Port	RS485 (GPRS, WLAN optional)						
Programmable relay	1x (30Vdc/3A or 250Vac/3A)						
Operating temperature range	-20°C to 65°C						
Relative humidity in operation	95% without condensation						
Altitude (m)	2000						
Mechanical Data							
Dimension (mm) (max)	499x272x144				570*310*154		620*320*164
Net Weight (kg)	14	18	18	20	29	31	34
Cooling	Forced fan						
Protection index	IP21						
Standards							
Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2						
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12						
Grid regulation	RD 1699						

All-in-one Solar Inverter

RiiO Sun II

2kVA / 3kVA / 4kVA | Single Phase | 120VAC

5kVA / 8kVA | Split Phase | 120/240VAC

Transformer-based
Maximize self-consumption
Feeding energy back into grid
Optional to work without battery

- Compatible with mainstream lithium battery brands
- Max inverter efficiency 94%, max MPPT efficiency 98%
- Extremely low self-consumption power
- Remote monitoring and control via Nova Web & APP
- Fully programmable by APP

* Please note: due to the inconsistency of grid regulatory requirements, you need to confirm with your supplier whether the Self-consumption/ ESS functionality of RiiO Sun II is allowed to be used or not.

RiiO Sun II series is TBB's brand-new versatile all-in-one solar inverter for off-grid, ESS and self-consumption applications, combining a pure sine wave inverter, battery charger, MPPT solar charge controller and a high-speed automatic transfer switch in a compact casing with a better display interface design and better human machine interface. Compared with the previous RiiO Sun series, it boasts higher PV open circuit voltage, higher PV charging power and current. It is optional to work without battery and only use solar energy to power loads directly. You can start with the comprehensive system or a smaller solution and gradually expand it, depending on what best suits your needs and budget. A programmable smart port is also equipped in both 5kVA and 8kVA models for generator input or load management.

Worth to mention, that RiiO Sun II supports energy feeding back to power loads on the AC input to maximize self-consumption and cut down system investment. AGS function now is also available for RiiO Sun II. Its power assist and power control function enable it work well with limited AC sources such as generators or limited grid. RiiO Sun II can automatically adjust its charging current by taking loads into account to protect the AC source from overload. Once the temporary peak power appears, it can also discharge the battery in an extremely short time to compensate the insufficient part of the limited AC source.

- All-in-one, plug and play design for easy installation
- Transformer-based, easily withstand the initial surge current
- Versatile for solar off-grid, ESS, self-consumption and backup power system
- Support parallel and three-phase up to 36kVA (2kVA/3kVA/4kVA model with RiiO Mate required)
- Support energy feeding back into grid
- Maximize self-consumption
- Optional to work without battery (only for single unit application with stable AC bypass supply, PV energy as a supplement for AC bypass)
- Auto restart when the PV or AC is recovering
- Higher PV open circuit voltage
- Higher PV charging power and current
- 2 MPPT trackers for 5kVA and 8kVA models
- Programmable output relay for generator start and sto
- A programmable smart port for 5kVA and 8kVA models
- Ultra-short transfer time (4ms) for mission-critical loads
- Better display interface design and better human machine interface
- Power assist and power control
- Built-in ECO Mode to prolong the battery backup time

Model No.	RiiO Sun II 2KVA-M-LV	RiiO Sun II 3KVA-M-LV	RiiO Sun II 2KVA-S-LV	RiiO Sun II 3KVA-S-LV	RiiO Sun II 4KVA-S-LV
Power Assist	Yes				
AC input range	85~140 VAC (45~65 Hz)				
AC input Current (transfer switch) (A)	50				
Inverter					
Nominal battery voltage (V) / Input voltage (V)	24 / 21~34		48 / 42~68		
AC output range	110/120/127 ± 2% VAC (50/60 ± 0.1% Hz)				
Harmonic distortion	<2%				
Load Power factor	1.0				
Cont. output power at 25°C (VA)	2000	3000	2000	3000	4000
Max output power at 25°C (W)	2000	3000	2000	3000	4000
Peak power (W)	4000	6000	4000	6000	8000
Surge	300%				
Maximum efficiency	91%	91%	93%	93%	93%
Zero load power (W)	13	17	13	17	19
Charger					
Charge voltage 'absorption' (V) / 'float' (V)	28.8 / 27.6		57.6 / 55.2		
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium				
Max AC charge current (A)	40	70	20	35	50
Temperature compensation	Yes				
Solar Charge Controller					
Max output current (A)	80	80	40	60	60
Maximum PV open circuit voltage (V)	150	150	250	250	250
MPPT voltage range (V)	40~145	40~145	65~245		
Number of MPPT trackers	1	1	1	1	1
Maximum PV input current per tracker (A)	36	36	24	36	36
Maximum PV short circuit current per tracker (A)	40	40	40	40	40
Maximum PV power per tracker (W)	3600	3600	3600	5200	5200
Charge voltage 'absorption' (V) / 'float' (V)	28.8 / 27.6		57.6 / 55.2		
MPPT charger maximum efficiency	98%				
MPPT efficiency	>99.5%				
Protection	a) output short circuit b) overload c) battery voltage too high d) battery voltage too low e) temperature too high f) input voltage out of range				
General data					
AC Out1 Current (A)	50				
Smart Port Current (A)	N/A				
Transfer time	4ms (<15ms in Weak AC source Mode)				
Protection	a) output short circuit b) overload c) battery voltage too high d) battery voltage too low e) temperature too high f) input voltage out of range				
General purpose com. Port	RS485 (GPRS, WLAN optional)				
Programmable relay	1x (30Vdc/3A or 250Vac/3A)				
Operating temperature range	-20°C to 65°C				
Relative humidity in operation	95% without condensation				
Altitude (m)	2000				
Mechanical Data					
Dimension (mm) (max)	499*272*144				
Net Weight (kg)	14	18	14	18	20
Cooling	Forced fan				
Protection index	IP21				
Standards					
Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2				
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4 EN 61000-3-11, EN 61000-3-12				

Model No.	RiiO Sun II 5KVA-S-SP	RiiO Sun II 8KVA-S-SP
Power Assist	Yes	
AC input range	Split phase: 180~276@240 (L1-L2); 90-138@120 (L1-N or L2-N)/ 45~65 Hz	
AC input Current (transfer switch) (A)	50	50

Inverter

Nominal battery voltage (V) / Input voltage (V)	48 / 42~68	
AC output voltage (VAC)	Split phase 120/240 ± 2%	
AC output Frequency (Hz)	50/60 ± 0.1%	
Harmonic distortion	<2%	
Load Power factor	1.0	
Cont. output power at 25°C (VA)	5000	8000
Max output power at 25°C (W)	5000	8000
Peak power (W)	10000	16000
Surge	300%	
Maximum efficiency	94%	95%
Zero load power (W)	22	32

Charger

Charge voltage 'absorption' (V) / 'float' (V)	57.6 / 55.2	
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium	
Max AC charge current (A)	60	90
Temperature compensation	Yes	

Solar Charge Controller

Max output current (A)	100	100
Maximum PV open circuit voltage (V)	250	250
MPPT voltage range (V)	65~245	
Number of MPPT trackers	2	2
Maximum PV input current per tracker (A)	36 + 36	36 + 36
Maximum PV short circuit current per tracker (A)	40 + 40	40 + 40
Maximum PV power per tracker (W)	4400 + 4400	4400 + 4400
Charge voltage 'absorption' (V) / 'float' (V)	57.6 / 55.2	
MPPT charger maximum efficiency	98%	
MPPT efficiency	>99.5%	
Protection	a) output short circuit b) overload c) battery voltage too high d) battery voltage too low e) temperature too high f) input voltage out of range	

General data

AC Out1 Current (A)	50	50
Smart Port Current (A)	50	50
Transfer time	4ms (<15ms in Weak AC source Mode)	
Protection	a) output short circuit b) overload c) battery voltage too high d) battery voltage too low e) temperature too high f) input voltage out of range g) input voltage ripple too high h) Fan block	
General purpose com. Port	RS485 (GPRS，WLAN optional)	
Programmable relay	1x (30Vdc/3A or 250Vac/3A)	
Operating temperature range	-20°C to 65°C	
Relative humidity in operation	95% without condensation	
Altitude (m)	2000	

Mechanical Data

Dimension (mm) (max)	570*310*154	620*320*164
Net Weight (kg)	29	34
Cooling	Forced fan	
Protection index	IP21	

Standards

Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4 EN 61000-3-11, EN 61000-3-12

RiiO Sun II

All-in-one Solar Inverter

Single Phase | 230VAC

2kVA / 3kVA / 4kVA / 5kVA / 6kVA / 8kVA

Single Phase | 120VAC

2kVA / 3kVA / 4kVA

Split Phase | 120/240VAC

5kVA / 8kVA

Off Grid Solution with ESS Capability

Solution Introduction

TBB off-grid solution is an ideal solution to provide independent power supply for areas with unstable grid or without access to grid. With ESS capability, it is also widely used to protect residential users or small businesses from rising electricity costs in areas with stable grid, to create reliable solutions for users to maximize self-consumption with solar energy and battery storage, secure power safety during an outage, take smart control of power management, and realize energy independence.

With transformer-based design, AGS function and excellent compatibility with generators and lithium batteries, Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II are ideal for off-grid applications, flexible to compose DC coupled PV system, AC Coupled PV system as well as the combination of both to meet various scenarios' need. With the aid of E4 LCD Monitor, Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II can realize complex ESS functionality.

Solution Highlights

- **Optimize Self-consumption**

  Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II can maximize self-consumption with solar and battery to cut down on high electricity expense. Connect some normal loads to the AC input of Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II, the solar energy will be used to power loads and charge batteries to a certain level. When there is any surplus, it can be fed back to power normal loads on the AC input, to maximize self-consumption and greatly reduce the system investment and save electricity bills.

- **Retrofit Existing Grid-tie System**

  When the subsidy of feeding energy into grid is greatly reduced or canceled, Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II can be applied to retrofitting the existing grid-tie system into energy storage system to store solar energy into the battery for local use rather than feeding back into the grid.

- **Peak Shaving**

  When there is large peak-to-valley price difference, Kinergier Pro CK-II/Tyrann/Apollo Matrix/Matrix II can charge batteries with grid electricity during low price periods and discharge batteries to power loads during high price periods. If there is still any surplus and the subsidy is high, it can be fed back into grid, to make a profit and greatly reduce electricity bills.

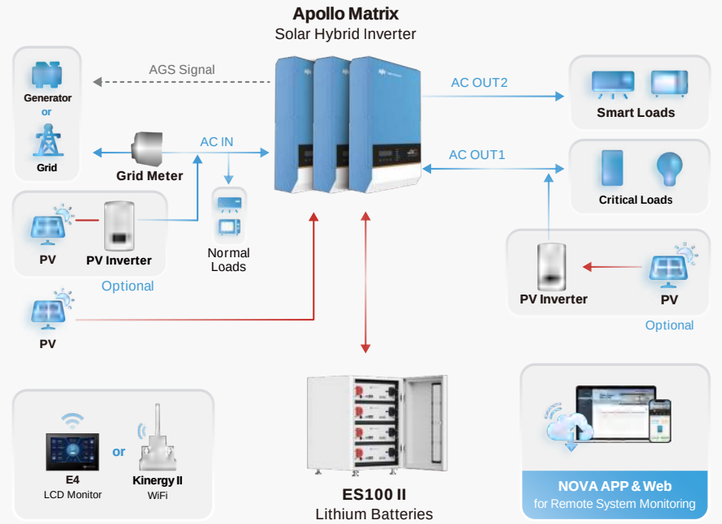
- **Self-consumption and Backup Power**

  The reserved battery SoC is configurable, depending on the grid failure is rare or common, to realize most efficient self-consumption and energy management & dispatch.

AC+DC Coupled PV System

With ESS Functionality

3kW-45kW | For Residential



Complete Solution

Solar Hybrid Inverter:

3kW-15kW Single Phase
9kW-45kW Three Phase

PV Inverter:

3kW-15kW Single Phase
9kW-45kW Three Phase

Battery:

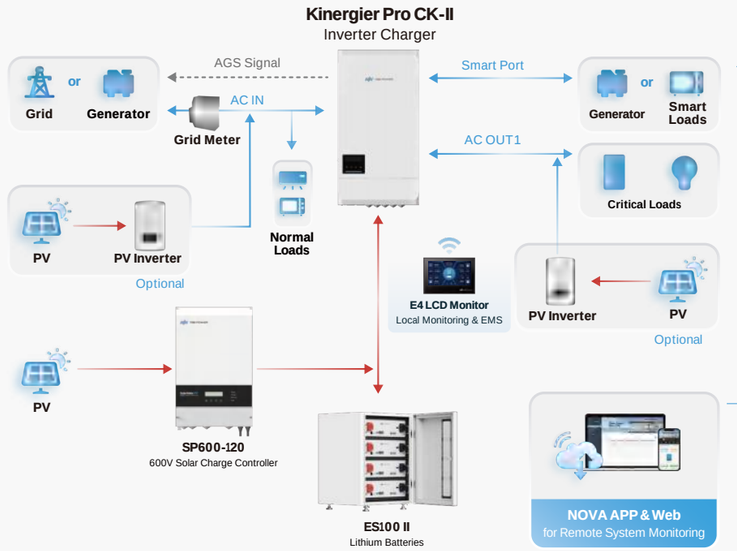
up to 161.28kWh

Ideal for residential off-grid and ESS applications, ranging from 3kW to 45kW; Only one AC input for connecting genset or grid; Flexible for DC Coupling, Input and Output AC Coupling; All-in-one design for easy installation.

AC+DC Coupled PV System

with ESS Functionality

2kW-72kW | For Residential & Commercial



Complete Solution

Inverter Charger:

2kW-24kW Single Phase
6kW-72kW Three Phase

PV Inverter:

2kW-24kW Single Phase
6kW-72kW Three Phase

MPPT Charger:

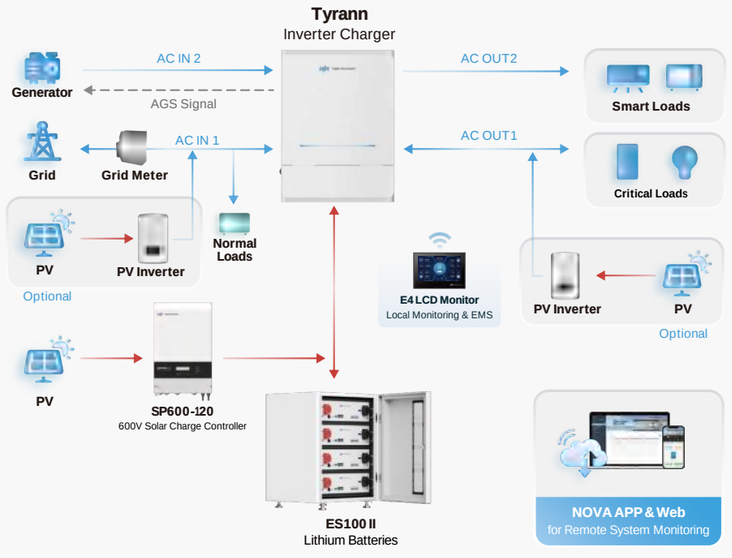
up to 105kW

Ideal for residential and small commercial off-grid and ESS appalications, ranging from 2kW to 72kW. Kinergier Pro CK-II is equipped with a smart port that can be programmed as a generator input to realize two AC inputs, or as an AC output for load management. Additionally, it can work with TBB 600V MPPT to achieve higher efficiency DC Coupling.

AC+DC Coupled PV System

with ESS Functionality

10kW-135kW | **For Residential & Commercial**



Complete Solution

Inverter Charger:

10kW-45kW Single Phase
30kW-135kW Three Phase

PV Inverter:

10kW-45kW Single Phase
30kW-135kW Three Phase

MPPT Charger:

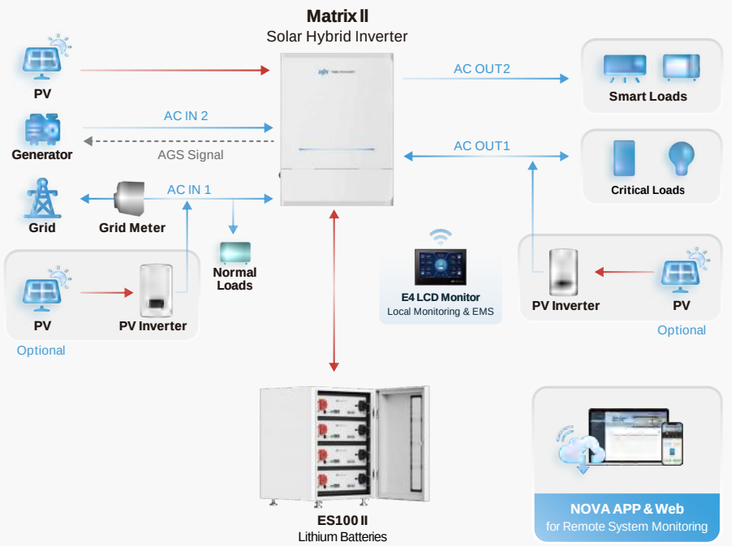
up to 105kW

Ideal for residential and commercial off-grid and ESS appalications, ranging from 10kW to 135kW. Tyrann is similar to Kinergier Pro CK-II, yet its single unit has higher power up to 15kW. Additionally, it is equipped with two AC inputs for connecting grid and generator or two generators. It can automatically select the active source or the prioritized AC source.

AC+DC Coupled PV System

with ESS Functionality

5kW-135kW | **For Residential & Commercial**



Complete Solution

Solar Hybrid Inveter:

5kW-45kW Single Phase
15kW-135kW Three Phase

PV Inverter:

5kW-45kW Single Phase
15kW-135kW Three Phase

MPPT Charger:

up to 105kW

Matrix II covers all applicaiton scenarios of both CK-II and Tyrann with easier installation because of its all-in-one design. It is built-in with 600V MPPT solar charge controller and reaches 15kW for a single unit. Built-in with multiple MPPT trackers, it provids greater system design flexibility.

ESS Working Logic

All these working logic can be set through E4 LCD Monitor

Under Zero Export to load and Zero Export to CT working logic, the PV solar is used to power loads and charge batteries in sequence based on different logic, and if there is any surplus, it will be fed back into grid.

1. Zero Export to Load:

The battery power is only supplied to the loads connected to the AC outputs

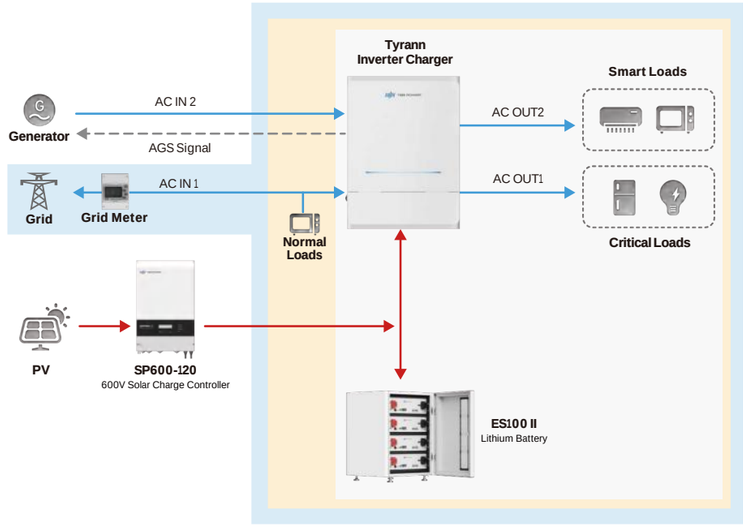
2. Zero Export to CT:

The battery power is not only supplied to the loads connected to the AC outputs but also supplied to the normal loads connected to the AC input

3. Selling First:

The PV energy can be fed back into the grid when there is any surplus with the premise that the PV energy can meet the demands of all the loads in the AC outputs and AC inputs and the battery SoC reaches a certain level.

Priority range of ESS energy supply under different working logic



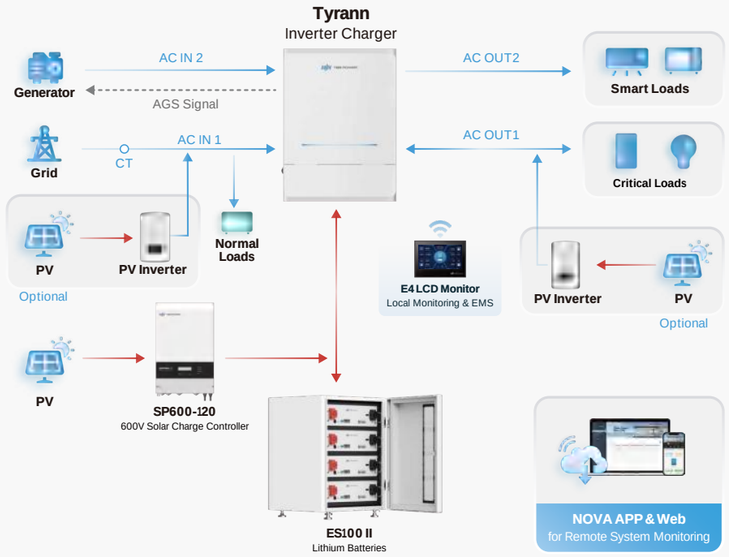
Priority range of ESS energy supply under differernt working logic

01 Zero Export to Load | 02 Zero Export to CT | 03 Selling First

Backup Off-grid

AC+DC Coupled PV System

10kW-135kW For Residential & Commercial



Complete Solution

Inverter Charger:

10kW-45kW Single Phase
30kW-135kW Three Phase

PV Inverter:

10kW-45kW Single Phase
30kW-135kW Three Phase

MPPT Charger:

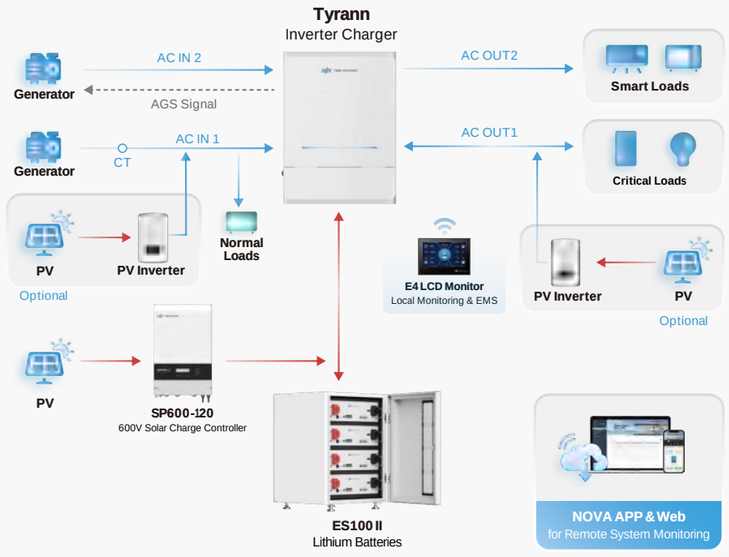
up to 105kW

Application Scenario: for scenarios with frequent power outages, fully utilizing solar energy to maximize energy self-con-sumptionm, guarantee continuous power suppy 24/7 and increase energy indepedence. Applicable to: Kinergier Pro CK-II, Tyrann, Apollo Matrix and Matrix II.

Pure Off-grid

AC+DC Coupled PV System

10kW-135kW For Residential & Commercial



Complete Solution

Inverter Charger:

10kW-45kW Single Phase
30kW-135kW Three Phase

PV Inverter:

10kW-45kW Single Phase
30kW-135kW Three Phase

MPPT Charger:

up to 105kW

Application scenario: for those living off the grid in remote locations such as islands or mountains and relying on generators for power, off-grid solar power systems offer a clean and cost-effective alternative. While reducing the need for generators and lowering energy bills, the generators can still serve as backup power sources during periods of low sunlight or system maintenance. Applicable to: Kinergier Pro CK-II, Tyrann, Apollo Matrix and Matrix II.

Available Components

A wide range of products for you to choose >>>

/ Inverter

MORE +

Apollo Matrix
Solar Hybrid Inverter

- For off-grid & ESS solutions
- 3kW/5kW
- Built-in MPPT to work with PV Panel
- Parallel and three-phase up to 9 units
- AGS
- ESS Capability

Matrix II
Solar Hybrid Inverter

- For off-grid & ESS solutions
- 5kW/10kW/15kW
- Built-in 600V MPPT
- Multiple MPPT trackers
- Two AC inputs & two AC outputs
- Parallel and three-phase up to 9 units
- AGS
- ESS Capability

Tyrann
Inverter Charger

- For off-grid & ESS solutions
- 10kW/15kW
- Two AC inputs
- Two AC outputs for smart load management
- Parallel and three-phase up to 9 units
- AGS
- ESS Capability

Kinergier Pro CK-II
Inverter Charger

- For off-grid & ESS applications
- 2kW/3kW/5kW/8kW
- Programmable smart port
- Parallel and three-phase up to 9 units
- AGS
- ESS Capability

/ Solar Charge Controller

Solar Mate
MPPT Solar Charge Controller

- 600V (120A)
- 250V (100A, 70A)
- 150V (120A, 80A, 60A)

/ PV Inverter

PV Inverter

- Compatible with Solis & Goodwe PV inverters
- More brands to come as the compatibility list expands

/ Battery

MORE +

PS5 Lithium Battery Bank

- 48V 105Ah 5.04kWh
- Parallel up to 32 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

PS10 Lithium Battery Bank

- 48V 210Ah 10.08kWh
- Parallel up to 16 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

ES100 II Lithium Battery

- 48V 105Ah 5.04 kWh
- 6000 cycles, 90% DOD
- Parallel up to 32 units

/ Rack for Battery

MORE +

Simple Mounting Bracket

- For installation of 4xES100 II

Power Rack Cabinet

- IP65
- For installation of 4xES100 II
- Support stack installation

/ Ground Fault Detection

MORE +

IRD300 PV Array Ground Fault Detection

- 60 - 300V PV Monitoring Range
- Monitor a single PV array or two arrays
- Support RS485 communication with TBB all-in-one solar inverter
- Compatible with SP150 and SP250 without communication

Monitoring Device

MORE +

Kinergy II-WiFi

External communication device to transfer the system data to the NOVA APP or Web for system remote monitoring and control

- Support Wi-Fi Protected Setup (WPS)
- Support BLE-config via APP
- Support RiiO Sun II, Kinergier Pro CK-II, Tyrann, Apollo Matrix, Matrix II, and Ingesola

E4 LCD Monitoring

Local Monitoring & EMS

- For system's local control and monitoring
- Support Wi-Fi communication to transfer system data to the NOVA to realize system remote monitoring

Ether Link

- Transmit system data to the NOVA App & Web for system monitoring and control
- Connects to the Internet via cable
- Supports 10M/100M bps Ethernet communication

Distribution

MORE +

AC Distribution

DC Distribution

PV BOX

All-in-one Cabinet

MORE +

Raython Model 0/1

All-in-one Standalone Solar Off-grid & ESS System

- 3-5kW | 5.04kWh-20.16kWh

Raython Model 2

All-in-one Standalone Solar Off-grid System

- 8kW | 10.08kWh-20.16kWh

Raython Model 3

All-in-one Standalone Solar Off-grid & ESS System

- 24kW | 40.32kWh-60.48kWh

Kinergier Pro CK-II is a multifunctional inverter charger, with feeding energy back into grid capability, an upgrade from CK. Based on all features of CK, CK-II boasts richer functionalities to meet more applications' need. In addition to off-grid application, CK-II, plus an external current sensor, can optimize the self-consumption without meter. With E4 LCD Monitor, CK-II is ideally suited for complex ESS applications for various countries.

More importantly, Kinergier Pro CK-II is equipped with a smart port which can be programmed as a generator input port to realize two AC inputs for the system, or as an AC output to power normal loads to realize smart load management during power outages.

Inverter Charger

Kinergier Pro

CK-II 2kW / 3kW / 5kW / 8kW 230Vac

Parallel and three-phase up to 9 units (2~72kW)
Feeding energy back into grid
Programmable smart port
For off-grid, ESS & Self-consumption applications
AGS, power assist & power control

- For off-gird, ESS applications
- Suitable for AC Coupled PV System, DC Coupled PV System and the combination of both
- Parallel and three-phase operation up to 9 units (72kW)
- With external current sensor to optimize self-consumption
- Realize ESS functionality via E4 LCD Monitor
- Time of Use: support scheduling multiple periods for battery charging and discharging
- Transformer-based, easily withstand the initial surge current from various heavy loads
- One programmable smart port for generator input or powering normal loads
- Feeding energy back into grid
- Compatible with SP600-120 to achieve a higher efficiency DC Coupled PV system
- Compatible with mainstream lithium battery brands and majority of generators
- Built-in with two relays for generator automatic start and stop (AGS)
- Power Assist and Power Control to maximize the use of limited AC power and prevent overload on the AC source
- 0ms UPS transfer switch to protect mission critical loads
- Local monitoring and control via E4 LCD Monitor
- Remote monitoring and control via NOVA APP or Web

Model No .	CK-II 2.0M	CK-II 3.0M	CK-II 5.0M	CK-II 2.0S	CK-II 3.0S	CK-II 5.0S	CK-II 8.0S
Power Assist	Yes						
Feedback into Grid	Yes						
AC input voltage range(VAC)	175~265						
AC input Frequency range(Hz)	45~65						
AC input Current (transfer switch) (A)	32		50	32		50	

Inverter

Nominal battery voltage (V)	24			48			
Input voltage range (V)	21~34			42~68			
AC output voltage(VAC)	220/230/240 ± 2%						
AC output Frequency(Hz)	50/60 ± 0.1%						
Harmonic distortion	< 2%						
Load Power factor	1.0						
Cont. output power at 25°C (VA)	2000	3000	5000	2000	3000	5000	8000
Cont. output power at 25°C (W)	1600	2500	4500	1600	2500	4000	6500
Output power (30min) at 25°C (W)	2000	3000	5000	2000	3000	5000	8000
Peak power (W)	6000	9000	15000	6000	9000	15000	24000
Cont. output power at 40°C (W)	1500	2200	3600	1500	2200	3700	5600
Maximum efficiency	94%	94%	94%	95%	95%	96%	96%
Zero load power (W)	11	14	23	11	14	18	26

Charger

Charge voltage 'absorption' (VDC)	28.8			57.6			
Charge voltage 'float' (VDC)	27.6			55.2			
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium						
Max AC charge current (A)	50	80	150	25	40	70	110
Temperature compensation	Yes						

General Data

AC Out1 Current (A)	32		50	32		50	
Smart Port Current (A)	32						
Transfer time	0ms (< 15ms in Weak AC source Mode)						
Remote on-off	Yes						
Programmable relay	2x						
Protection	a) output short circuit, b) overload, c) battery voltage too high, d) battery voltage too low, e) temperature too high, f) input voltage out of range, g) input voltage ripple too high, h) Fan block						
ComSync communication port	For parallel and three phase operation						
ComMON communication port	For remote monitoring and system integration						
Operating temperature range	-20˚C~65˚C						
Relative humidity in operation	95% without condensation						
Altitude (m)	2000						

Mechanical Data

Dimension (mm) (max)	499*272*144		620*320*164	499*272*144		570*310*154	620*320*164
Net Weight (kg)	16	19	32	16	19	30	36
Cooling	Forced fan						
Protection category	IP21						

Standard

Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2, EN-IEC 62040-1
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12
Grid Regulation	VDE-AR-N 4105*, NRS 097-2-1:2017*, AS/NZS 4777.2:2020*, NTS 2.1 (A)*, RD 1699*

* Coming soon

Inverter Charger

Tyrann

10kW / 15kW

Two AC inputs & Two AC outputs
ESS Functionality
Parallel and three-phase capability (10kW-135kW)
Compatible with majority of generators
Power Assist & Power Control

Tyrann is an inverter charger similar to Kinergier Pro, yet it features two independent AC inputs for connecting the grid and a generator, or two generators. It can automatically select the active source or the user-preset prioritized AC source based on the system demand. When peak power is required for a limited period, Tyrann will discharge the battery immediately to compensate the insufficient part of the limited AC source, safeguarding an uninterruptible power supply for loads to the maximum extent.

Worth to mention, that Tyrann boasts ESS functionality, supporting energy feeding back into the grid. Its single-machine maximum power is up to 15kW, featuring a stronger surge capacity to carry inductive loads with high initial current. In addition, it works well with TBB latest SP600-120 solar charge controller which supports higher open circuit voltage. They are the perfect couple in composing a DC Coupled PV system with higher efficiency.

- Two AC inputs for grid and generator (or for two generators)
- Two AC outputs: one usual uninterruptible output, one programmable output for load management
- Support feeding energy back into the grid
- Support ESS functionality via E4 LCD Monitor
- Support AC Coupled PV system, DC Coupled PV system or the combination of both
- Compatible with SP600-120 to achieve a higher efficiency DC Coupled PV system
- Transformer based, easily withstand the initial surge current from various inductive loads
- Parallel and three phase operation up to 9 units (135kW)
- 0ms UPS class transfer time to protect mission-critical loads
- Support system wake-up when AC source or PV is regained, to effectively prevent the system from becoming deadlock due to low battery voltage/SoC, to realize unattended function
- Support two independent CAN Buses for flexible system communication, one for parallel connection, the other for monitoring communication
- Power Assist and Power Control to maximize the use of limited AC power and prevent overload on the AC source
- Minimize the impact of loads on batteries when the grid is available
- Built-in three programmable relays, supporting automatic generator start and stop (AGS)
- More flexible in system application
- Remote monitoring and control via NOVA APP or Web

Model No.	Tyrann 10.0S	Tyrann 15.0S
Product topology	Transformer based	
Power Assist	Yes	
Feedback into Grid	Yes	
AC input range	175~265VAC / 45Hz~55Hz@50Hz (normal), 55Hz~65Hz@60Hz (normal)	
AC input Current (transfer switch) (A)	2x100	

Inverter

Nominal battery voltage / Input voltage (VDC)	48 / 42~68	
AC output voltage(VAC) / Frequency(Hz)	220/230/240VAC± 2%, 50/60Hz ± 0.1%	
Harmonic distortion	<2%	
Load Power factor	1.0	
Cont. output power at 25°C (VA)	10000	15000
Peak power (30min) (W)	10000	15000
Cont. output power at 25°C (W)	8000	13000
Cont. output power at 40°C (W)	6500	11000
Cont. output power at 65°C (W)	4500	7200
Peak power(W)	30000	45000
Surge	300%	
Maximum efficiency	96%	
Zero load power (W)	40	60

Charger

Charge voltage 'absorption' (V) / 'float' (V)	57.6 / 55.2	
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium	
Max AC charge current (A)	140	200
Temperature compensation	Yes	

General data

Main Output (AC Out1) Current (A)	100	100
Auxiliary Output (AC Out2) Current (A)	50	50
Transfer time	0ms (<15ms in Weak AC source Mode)	
Remote on-off	Yes	
Programmable relay	3x	
Protection	a) output short circuit; b) overload; c) battery voltage too high; d) battery voltage too low; e) temperature too high; f) input voltage out of range; g) input voltage ripple too high; h) Fan block	
ComSync communication port	For parallel and three phase operation	
ComMON communication port	For remote monitoring and system integration	
Operating temperature range	-40°C~+65°C	
Relative humidity in operation	95% without condensation	
Altitude (m)	3500m	

Mechanical Data

Battery connection	Bolts M8*2*2	
AC connection	Bolts M6	
Dimension (mm) (max)	670*498*292	
Net Weight (kg)	60	80
Cooling	Forced fan	
Protection Category	IP21	

Standards

Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2, EN-IEC 62040-1
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12
Grid Regulation	NRS 097-2-1:2017*, AS/NZS 4777.2:2020*, VDE-AR-N 4105 *, NTS 2.1 (A)*, RD 1699*

* Coming soon

Solar Hybrid Inverter

Apollo Matrix

3kW / 5kW

Support feeding energy back into the grid
Parallel and three-phase capability

Apollo Matrix is an all-in-one solar hybrid inverter combining an inverter charger, an MPPT solar charge controller and a high-speed automatic transfer switch in one enclosure, designed for various applications, including off grid and residential ESS applications, to ensure the most efficient energy consumption even in an extremely complicated system. Its high surge capability makes it capable to deal with the initial currents of the high-demanding appliances, such as air conditioner,water pump, washing machine, freezer etc.

It's capable to expand system capacity up to 45kW with 9 units in parallel and three-phase operation. It supports feeding energy back into the grid for residential ESS application. In an off-grid application, thanks to its power assist and power control function, it works well with poor generators. Apollo Matrix can automatically adjust its charging current by taking loads into account to protect the generator from overload. Once the temporary peak power appears, it can also discharge the battery to supply power to compensate the insufficient part of the generator.

- All-in-one design for easy installation
- Transformer based low frequency battery inverter, reliable for heavy loads running
- Maximum self-consumption, no more worries about rising electricity prices
- Peak shaving: discharging batteries at peak hours, to reduce your electricity bills
- "Time of use" function, support 8 different time periods for charging and discharging battery
- AC coupling possibility to update existing solar system to energy storage system
- Compatible with mainstream lithium battery brands
- Feed-in-tariff(optional): feeding overproduced energy to the grid and get paid
- Ensure uninterruptible operation during weak solar generation or grid failure in 0-2ms
- Support max. 9 units paralleled and three-phase application
- Two AC outputs for load management
- Flexible and smart management of various power sources including PV, grid, batteries and generator
- Local monitoring and control on E4 LCD monitor
- Remote monitoring and control on NOVA Web or APP anywhere anytime via Wi-Fi communication

Model No.	Apollo Matrix 3.0M	Apollo Matrix 3.0S	Apollo Matrix 5.0S
Power Assist	Yes		
Feedback into Grid	Yes		
AC inputs	Input voltage range: 175~265 VAC, Input frequency: 45~65Hz		
AC input Current	32A (transfer switch)		50A (transfer switch)

Inverter

Nominal battery voltage (VDC)	24	48	
Input voltage range (VDC)	21~34	42~68	
Output	Voltage: 220/230/240 VAC ± 2%, Frequency: 50/60 Hz ± 0.1%		
Harmonic distortion	<2%		
Power factor	1.0		
Cont. output power at 25°C (VA)	3000	3000	5000
Max Output power at 25°C (W)	3000	3000	5000
Peak power (W)	9000	9000	15000
Maximum efficiency	94%	95%	96%
Zero load power (W)	14	14	18

Charger

Charge voltage 'absorption' (V) / 'float' (VDC)	28.8 / 27.6	57.6 / 55.2	
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium		
Battery Charge current (A)	80	40	70
Temperature compensation	Yes		

Solar Charger Controller

Max output current (A)	60	60	90
Maximum PV power (W)	2000	4000	6000
PV open circuit voltage (V)	150		
MPPT voltage range (V)	65~145		
PV short circuit current (A)	18	35	54
MPPT charger maximum efficiency	98%		
MPPT efficiency	99.5%		
Protection	a) output short circuit, b) overload, c) battery voltage too high d) battery voltage too low, e) temperature too high, f) input voltage out of range		

General data

AC Out Current (A)	AC Out1 Current: 32 AC Out2 Current: 32	AC Out1 Current: 50 AC Out2 Current: 32
Transfer time	<0ms (<15ms when Weak Grid Mode)	
Remote on-off	Yes	
Programmable relay	2x	
Protection	a) output short circuit, b) overload, c) battery voltage too high, d) battery voltage too low e) temperature too high, f) input voltage out of range, g) input voltage ripple too high, h) Fan block	
ComSync communication port	For parallel and three phase operation	
ComMON communication port	For remote monitoring and system integration	
Operating temperature range	-20 ~ +65°C	
Storage temperature range	-40 ~ +70°C	
Relative humidity in operation	95% without condensation	
Altitude (m)	2000	

Mechanical Data

Dimension (mm)	499*272*144	499*272*144	570*310*154
Net Weight (kg)	20	20	32
Cooling	Forced fan		
Protection index	IP21		

Standards

Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12
Grid Regulation	NRS 097-2-1:2017, NTS 2.1 (A)*, RD 1699*

* Coming soon

Solar Hybrid Inverter

Matrix II

5kW / 10kW / 15kW

Built-in 600V MPPT
Two AC inputs & Two AC outputs
ESS Functionality
Multiple MPPT trackers
Parallel and three-phase capability (5kW-135kW)

Matrix II is an all-in-one solar hybrid inverter, a combination of a high efficiency inverter charger and a 600V MPPT solar charge controller. Ideal for complex ESS applications, it is an upgraded version of Apollo Matrix Series, with higher power output and more functionalities. It reaches 15KW for a single unit, and up to 9 units can be connected in parallel and three-phase configuration (up to 135kW). Designed with two AC inputs, Matrix II 10kW and 15kW can be connected to two independent AC sources such as the grid and a generator, or two generators, and it will automatically select the active source. Equipped with one programmable smart port for generator input or powering normal loads, Matrix II 5kW can also realize two AC inputs. Built-in with 600V solar charge controller, Matrix II features higher PV open circuit voltage, higher PV charging power and current.

Characterized by strong surge capability, AGS function, power assist and power control capability, it is suitable for pure off-grid applications. Designed with ESS functionality, it can maximize self-consumption with solar and battery to cut down on high electricity expense, and retrofit existing grid-tie system through AC couple operation. Moreover, it supports 6 time periods setting for battery charging and discharging, to efficiently achieve peak shaving, thus greatly reducing electricity bills.

- 10kW & 15kW models: two AC inputs for grid and generator (or for two generators)
- 5kW: one programmable smart port for generator input or powering normal loads
- Two AC outputs: one usual uninterruptible output, one programmable output for load management
- Support feeding energy back into the grid
- Support ESS functionality via E4 LCD Monitor
- Support AC Coupled PV system, DC Coupled PV system or the combination of both
- Built in with 600V MPPT solar charge controller to achieve a higher efficiency DC Coupled PV system
- Transformer based, easily withstand the initial surge current from various inductive loads
- Parallel and three phase operation up to 9 units (135kW)
- 0ms UPS class transfer time to protect mission-critical loads
- Remote monitoring and control via NOVA APP or Web
- Built-in multiple MPPT trackers, providing greater system design flexibility, enabling multi-directional installation of rooftop solar panels
- Support system wake-up when AC source or PV is regained, to effectively prevent the system from becoming deadlock due to low battery voltage/SoC, to realize unattended function

- Support two independent CAN Buses for flexible system communication, one for parallel connection, the other for monitoring communication
- Power Assist and Power Control to maximize the use of limited AC power and prevent overload on the AC source
- Minimize the impact of loads on batteries when the grid is available
- Built-in three programmable relays, supporting automatic generator start and stop (AGS)
- More flexible in system application

Model No.	Matrix II 5.0S	Matrix II 10.0S	Matrix II 15.0S
Product topology	Transformer based		
Power Assist / Grid feedback	Yes / Yes		
AC input range	175~265VAC / 45Hz~55Hz@50Hz (normal), 55Hz~65Hz@60Hz (normal)		
AC input Current (transfer switch) (A)	50	2x100	2x100

Inverter

Nominal battery voltage (V) / Input voltage (V)	48 / 42~68		
AC output voltage / frequency	220/230/240VAC ± 2% / 50/60Hz ± 0.1%		
Harmonic distortion / Load Power factor	<2% / 1.0		
Cont. output power at 25°C (VA)	5000	10000	15000
Peak power (30min) (W)	5000	10000	15000
Cont. output power at 25°C(W)/40°C (W)/65°C (W)	4000 / 3700 / 3000	8000 / 6500 / 4500	13000 / 11000 / 7200
Peak power (W) / Surge	15000 / 300%	30000 / 300%	45000 / 300%
Maximum efficiency	96%		
Zero load power (W)	18	40	60

Charger

Charge voltage 'absorption' (V) / 'float' (V)	57.6 / 55.2		
Battery types	AGM / GEL / OPzV / Lead-Carbon / Flooded / Traction / Lithium		
Max AC charge current (A)	70	140	200
Temperature compensation	Yes		

Solar Charge Controller

Max output current(A)	120	240	240
Maximum PV open circuit voltage (V)	600		
PV / MPPT operating voltage range (V)	120-525 / 80-525		
Maximum charge Power	7000W @ 57.6V total 5000W @ 57.6V per tracker	14000W @ 57.6V total 5000W @ 57.6V per tracker	14000W @ 57.6V total 5000W @ 57.6V per tracker
Number of MPPT trackers	2	4	4
Maximum PV input / short circuit current per tracker (A)	18+18 / 20+20	18+18+18+18 / 20+20+20+20	18+18+18+18 / 20+20+20+20
Maximum PV power per tracker (W)	8000+8000	8000+8000+8000+8000	8000+8000+8000+8000
Charge voltage 'absorption' (V) / 'float' (V)	Default: 57.6 / 55.2		
Maximum efficiency / MPPT efficiency	97% / >99.9%		
PV array insulation resistance detection	Integrated		
Protection	a) battery voltage too high, b) battery voltage too low, c) temperature too high, d) PV reverse polarity, e) surge		

General data

Main Output (AC Out1) Current (A)	50	100	100
Auxiliary Output (AC Out2) Current (A)	32 (Smart Port)	50	50
Transfer time	0ms (<15ms in Weak AC source Mode)		
Remote on-off / Programmable relay	Yes / 2x	Yes / 3x	Yes / 3x
Protection	a) output short circuit, b) overload, c) battery voltage too high, d) battery voltage too low, e) temperature too high, f) input voltage out of range, g) input voltage ripple too high, h) Fan block		
ComSync communication port	For parallel and three phase operation		
ComMON communication port	For remote monitoring and system integration		
Operating temperature range / Relative humidity	-40˚C~+65˚C / 95% without condensation		
Altitude (m)	3500m		

Mechanical Data

Dimension (mm) (max) / Net Weight (kg)	TBD
Cooling / Protection Category	Forced fan / IP21

Standards

Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2, EN-IEC 62040-1
EMC	EN-IEC 61000-6-1, EN-IEC 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-11, EN 61000-3-12
Grid Regulation	NRS097-2-1:2017*, AS/NZS4777.2:2020*, VDE-AR-N4105*, NTS2.1(A)*, RD1699*

* Coming soon

Residential Hybrid ESS Solution

Solution Introduction

TBB Residential Hybrid ESS Solution is an ideal solution to protect residential users or small business from rising electricity in areas with stable grid. It is suitable for the following typical applications: maximizing solar self-consumption, retrofitting existing grid-tie systems, grid peak shaving and providing backup power for critical loads.

With excellent flexibility, it supports various system compositions to meet different applications' need, including Hybrid ESS, AC Coupled PV ESS, Power Backup (with generator) and EV Charging (with EV Charger & V2G Charger).

Solution Hightlights

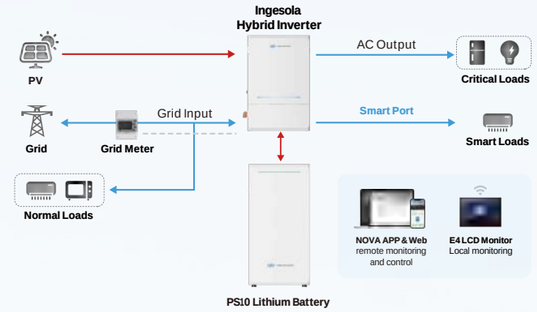
- Maximize self-consumption with solar and battery to reduce high electricity bills
- Feed the surplus energy to power the normal loads on the AC input to maximize self-consumption and reduce the system investment
- Retrofit the existing grid-tie system into a energy storage system
- Peak shaving: support 8 time periods for battery charge and discharge, allowing users to charge battery at the off-peak time and discharge battery at peak time.
- The reseved SoC is configurable, depending on the frequency of grid failure, to ensure the backup power for critical loads while guaranteeing high efficiency self-consumption and energy management.
- Highly integrated design for easy installation, saving installation space
- One programmable smart port for generator input to realize two AC inputs, or hierarchical load management, or connecting the grid-tied inverter, or EV charger & V2G charger, based on different demands
- Working mode: Zero export to load, Zero export to CT and Selling first
- 0-10ms UPS ability, fast response, intelligent control
- Remote system monitoring via NOVA APP or Web

ESS Applications

Work with Solar

Hybrid ESS Solution

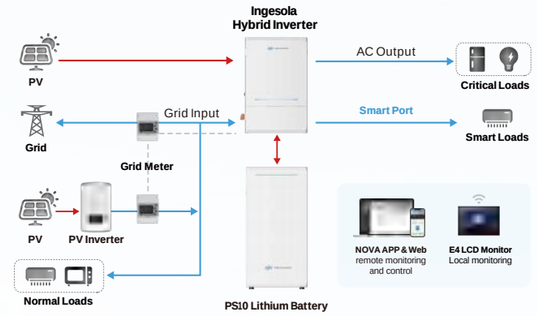
Suitable for all application scenarios.



The following two solutions are suitable for scenarios with more energy consumption in the day and less consumption at night, like offices.

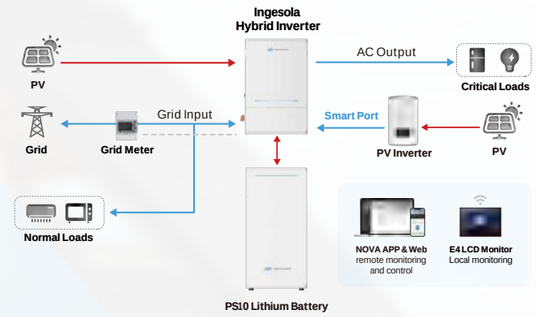
Hybrid ESS Solution with AC Coupled PV on Input

Mostly for retrofitting an existing PV grid-tie system into an ESS system by adding a CT or Energy Meter.



Hybrid ESS Solution with AC Coupled PV on Output

Mostly for retrofitting an existing PV grid-tie system into an AC Coupled PV ESS system without adding CT or Energy Meter. When the grid fails in the daytime, the PV inverter can also keep generating electricity.

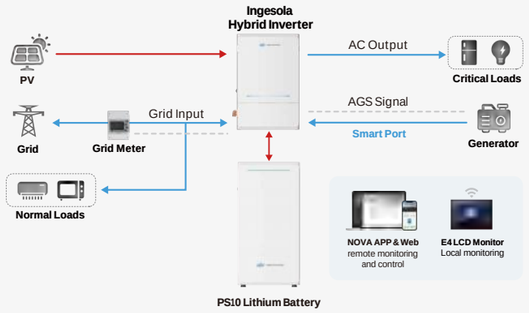


Work with Generator

Power Backup Solution

Suitable for a newly installed system.
Application scenario: unstable grid or non-stop power supply required, like fire fighting systems.

TBB POWER

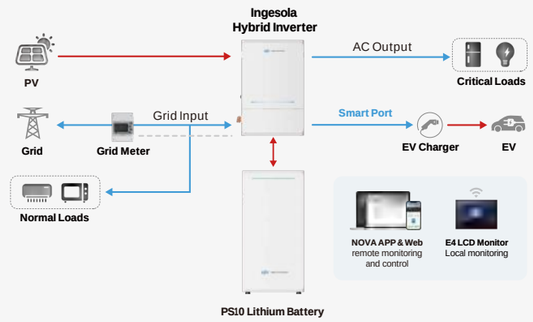


Work with EV Charger & V2G Charger

Pair Energy Storage System with EV Chargers

The EVs can be charged with surplus solar energy, with the battery if the battery SoC is higher than a certain level, or with grid power during low or negative price periods, to realize time-of-use arbitrage and cut your bills.

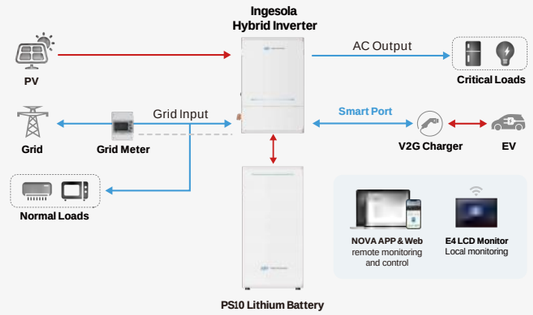
TBB POWER



Pair Energy Storage System with V2G Chargers

When working with the V2G chargers, the system can charge the EVs with surplus solar to save bills. When the PV and the battery are not enough to power loads, the system can also draw the stored energy from EVs to compensate the insufficient part.

TBB POWER



Residential Hybrid ESS Solution

T B B R E N E W A B L E

Available Components

A wide range of products for you to choose >>>

/ Inverter

Ingesola

Hybrid Inverter

- For DC Couple & AC Couple ESS applications
- 10kW/12kW/15kW | 230/400Vac (Three-phase)
- 6kW/8kW/10kW | 120/240Vac (Split-phase)
- 48V | 3 MPPTs
- Two AC inputs or Two AC outputs
- Parallel up to 3 units
- IP65 Rated

/ PV Inverter

PV Inverter

- Compatible with Solis & Goodwe PV inverters
- More brands to come as the compatibility list expands

/ Battery

MORE +

PS5 Lithium Battery Bank

- 48V 105Ah 5.04kWh
- Parallel up to 32 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

PS10 Lithium Battery Bank

- 48V 210Ah 10.08kWh
- Parallel up to 16 units
- Wall-mounted or floor-mounted
- 6000 cycles, 90% DOD
- IP65

/ Monitoring Device

MORE +

Kinergy II-WiFi

External communication device to transfer the system data to the NOVA APP or Web for system remote monitoring and control

- Support Wi-Fi Protected Setup (WPS)
- Support BLE-config via APP
- Support RiiO Sun II, Kinergier Pro CK-II, Tyrann, Apollo Matrix, Matrix II, and Ingesola

E4 LCD Monitoring

Local Monitoring

- For system's local control and monitoring
- Support Wi-Fi communication to transfer system data to the NOVA to realize system remote monitoring

Ether Link

- Transmit system data to the NOVA App & Web for system monitoring and control
- Connects to the Internet via cable
- Supports 10M/100M bps Ethernet communication

/ Distribution

MORE +

AC Distribution

DC Distribution

PV BOX

TBB brand new Ingesola 10T/12T/15T is a three-phase hybrid inverter, ranging from 10 to 15kW, with Max. 1.95 DC/AC ratio, 3 MPPT trackers and 48V low battery voltage. It supports three-phase unbalanced output, flexible for various application scenarios. With parallel capability, it offers a scalable solution for residential and small commercial ESS applications, supporting battery heterogeneity. It is ideal for Hybrid ESS, AC Coupled PV ESS, Power Backup (with generator) and EV Charging (with EV Charger & V2G Charger).

Equipped with a programmable smart port, it can support smart load management, generator input to realize two AC inputs, and connecting grid-tie inverter. With 0~10ms ultra fast transfer time, it ensures system uninterruptible power supply for the mission critical loads when grid outages occur. With built-in EMS, it supports 8 time periods for battery charging and discharging, ideal for peak shaving application.

Hybrid Inverter

Ingesola

10kW / 12kW / 15kW | 230/400Vac

48V Three-phase | 3 MPPT
IP65 Rated
Two AC inputs or Two AC outputs
DC Couple & AC Couple ESS

- Support Hybrid ESS for all application scenarios, and support AC Couple to retrofit existing solar systems
- Support two AC inputs (Grid & Generator) or two AC outputs
- One programmable smart port for generator input to realize two AC inputs, or hierarchical load management, or connecting the grid-tied inverter, or EV charger & V2G charger, based on different demands
- Support battery heterogeneity: when multiple Ingesola are connected in parallel and each has independent battery bank, the battery banks can be different in types or the same type with different capacity
- Three-phase unbalanced output
- Max. Charging/discharging current of 300A
- 3 MPPT trackers, flexible for 3-direction installation of solar panels
- Built-in EMS, support 8 time periods for battery charging and discharging
- Support CAN, RS485 and DRM
- IP65 Rated
- Working mode: Zero export to load, Zero export to CT and Selling first
- Self-consumption, long lifespan, 0-10ms UPS ability, fast response, intelligent control
- Remote system monitoring via NOVA APP or Web

Model No.	Ingesola 10T	Ingesola 12T	Ingesola15T
Grid input			
Feedback to grid	Yes		
Nominal AC input voltage	Three phase 3P4W+PE, 220/380Vac, 230/400Vac, 240/415Vac, 50/60Hz		
AC Input range	-25%~+20% or According to Grid Code Standard; 50Hz:+/-5Hz; 60Hz:+/-5Hz		
AC input Current (transfer switch)	45A		
AC Input Current Limit Function & Surge Protection	Yes		
Generator input			
Nominal AC input voltage	Three phase 3P4W+PE, 220/380Vac, 230/400Vac, 240/415Vac, 50/60Hz		
AC Input range	-25%~+20%; 40Hz-70Hz		
AC input Current (transfer switch)	32A		
AC Input Current Limit Function	Yes		
Inverter			
Nominal AC output range	Three phase 3P4W+PE, 230/400Vac+/-2%; 50/60Hz+/-0.1%		
Harmonic distortion	Linear load<2%, Non-linear load <5%		
Nominal Output Power	10000VA	12000VA	15000VA
Max. AC output power	11000VA	13200VA	16500VA
Peak power (off grid)	20000VA 60S	24000VA 60S	30000VA 10S
Nominal AC Output Current	15.2A	18.2A	22A
Output Power Factor	1	1	1
Maximum efficiency	97.8%	97.8%	97.8%
Zero load power (W)	80	80	80
DC			
DC Voltage Range	40V-60V		
Battery types	Lead acid battery, Lithium battery		
Charging strategy for Li-Ion battery	Self adaption to BMS		
Max. Charging/ Discharging Current	210A/210A	250A/250A	300A/300A
Solar			
Max. DC input power	19500W		
Max. PV Input Voltage	1000V		
MPPT Voltage Range / Start-up Voltage	150-800V / 160V		
Max. PV Input Current / Max.Short Current	16A+16A+16A / 20A+20A+20A		
MPPT Number / No. Strings Per MPPT Tracker	3 / 1+1+1		
General			
Backup	UPS		
Max. AC Pass-through Current	32A		
Protection	a) output short circuit, b) overload , c) battery voltage too high , d) battery voltage too low, e) temperature too high, f) input voltage out of range, g) input voltage ripple too high, h) Fan block		
CAN Bus communication port	For parallel operation		
General purpose com. Port	DRM, RS485		
Display	LED+ External Touch LCD screen		
Operating temperature range & relative humidity	-25℃~60℃>45℃ de-rating; 95% without condensation		
Altitude (m)	3000		
Dimension (Wx D x H) (mm)	484*250*740		
Weight (kg)	30	31	32
IP Protection	IP65 (Outdoor)		
Grid Regulation	AS/NZS 4777.2, IEC61727, IEC62116, IEC61683, NRS097-2-1		
Safety & EMC	IEC62109-1/-2,IEC61000-6-1,IEC61000-6-3,IEC61000-3-11,IEC61000-3-12,NTS2.1(A),RD1699		
Warranty	5 Year Product Warranty, 10 Year Performance Warranty		

TBB brand new Ingesola 6SP/8SP/10SP is a hybrid inverter, ranging from 6 to 10kW. Designed with 3 MPPT trackers and 48V low battery voltage, it is flexible for various application scenarios. With parallel capability, it offers a scalable solution for residential and small commercial ESS applications, supporting battery heterogeneity. It is ideal for Hybrid ESS, AC Coupled PV ESS, Power Backup (with generator) and EV Charging (with EV Charger & V2G Charger).

Equipped with a programmable smart port, it can support smart load management, generator input to realize two AC inputs, and connecting grid-tie inverter. With 0-10ms ultra fast transfer time, it ensures system uninterruptible power supply for the mission critical loads when grid outages occur. With built-in EMS, it supports 8 time periods for battery charging and discharging, ideal for peak shaving application.

Hybrid Inverter

Ingesola

6kW / 8kW / 10kW | 120/240Vac

48V Split-phase | 3 MPPT
IP65 Rated
Two AC inputs or Two AC outputs
DC Couple & AC Couple ESS

- Support Hybrid ESS for all application scenarios, and support AC Couple to retrofit existing solar systems
- Support two AC inputs (Grid & Generator) or two AC outputs
- One programmable smart port for generator input to realize two AC inputs, or hierarchical load management, or connecting the grid-tied inverter, or EV charger & V2G charger, based on different demands
- Support up to 3 units in parallel
- Support battery heterogeneity: when multiple Ingesola are connected in parallel and each has independent battery bank, the battery banks can be different in types or the same type with different capacity.
- 3 MPPT trackers, flexible for 3-direction installation of solar panels
- Built-in EMS, support 8 time periods for battery charging and discharging
- Support CAN and RS485
- IP65 Rated
- Working mode: Zero export to load, Zero export to CT and Selling first
- Self-consumption, long lifespan, 0-10ms UPS ability, fast response, intelligent control
- Remote system monitoring via NOVA APP or Web

Model No.	Ingesola 6SP	Ingesola 8SP	Ingesola 10SP
Grid input			
Grid feedback	Yes		
Nominal AC input voltage	Split phase 120/240Vac, 2/3 phase 208V		
AC Input Voltage Range(VAC)	-25%~+15%,Split phase : 180~280@240 (L1-L2); 90-138@120V (L1/2-N) 2/3 phase: L1-L2 156~240@208 (L1-L2); 90-138@120V (L1/2-N)) / 40-70Hz		
AC input Current (transfer switch) (A)	40	63	63
AC Input Current Limit Function & Surge Protection	Yes		
Generator input			
Nominal AC input voltage	Split phase 120/240Vac ; 2/3 phase 208V		
AC Input range(VAC)	-25%~+15%, Split phase : 180~280@240 (L1-L2); 90-138@120V (L1/2-N)2/3 phase: L1-L2 156~240@208 (L1-L2); 90-138@120V (L1/2-N)		
AC input Current (transfer switch) (A)	40	63	63
AC Input Current Limit Function	Yes		
Inverter			
Nominal AC output voltage	Split phase 120/240Vac, 2/3 phase 208V		
Harmonic distortion	Linear load<2%, Non-linear load <5%		
Nominal Output Power (VA)	6000VA	8000VA	10000VA
Max. AC output power (VA)	6600VA	8800VA	11000VA
Peak power (off grid)	2 Times of Rated Power, 10s		
Nominal / Max. AC Output Current	25A / 37.5A	33.3A / 50.0A	41.6A / 50A
Output Power Factor	1	1	1
DC			
DC Voltage Range	40-60	40-60	40-60
Battery types	Lead acid battery, Lithium battery		
Charging strategy for Li-Ion battery	Self adaption to BMS		
Max. Charging/ Discharging Current	125A/125A	167A/167A	210A/210A
Solar			
Max. DC input power (W)	9000W	12000W	15000W
Max. PV Input Voltage (V)	500		
MPPT Voltage Range /Start-up Voltage	125-430V / 160V		
Max. PV Input Current / Max.Short Current	20A+20A / 22A+22A	20A+20A+20A / 22A+22A+22A	
MPPT Number / No. Strings Per MPPT Tracker	2 / 1+1	3 / 1+1+1	
General			
Backup	UPS	UPS	UPS
Max. AC Pass-through Current	40A	63A	63A
Protection	a) output short circuit; b) overload, c) battery voltage too high, d) battery voltage too low, e) temperature too high, f) input voltage out of range, g) input voltage ripple too high, h) Fan block		
CAN Bus communication port	For parallel operation		
General purpose com. Port	RS485		
Display	LED		
Operating temperature range & relative humidity	-25℃~60℃>45℃de-rating; 95% without condensation		
Altitude (m)	3000		
IP Protection	IP65 (Outdoor)		
Grid Regulation	IEEE 1547, IEEE 1547.1, UL 1741SA, CA Rule 21, Hawaiian Rule14H, PRC-024-1		
Safety & EMC	UL 1741, CSA C22.2 No. 107.1, FCC Part 15		
Warranty	5 Year Product Warranty, 10 Year Performance Warranty		

Mini Grid Solution

33kW-330kW **Commercial & Indurstical**

PV Inverter: 30kW-300kW
Battery: 43.2kWh-2,160kWh
Inverter: 33kW-330kW

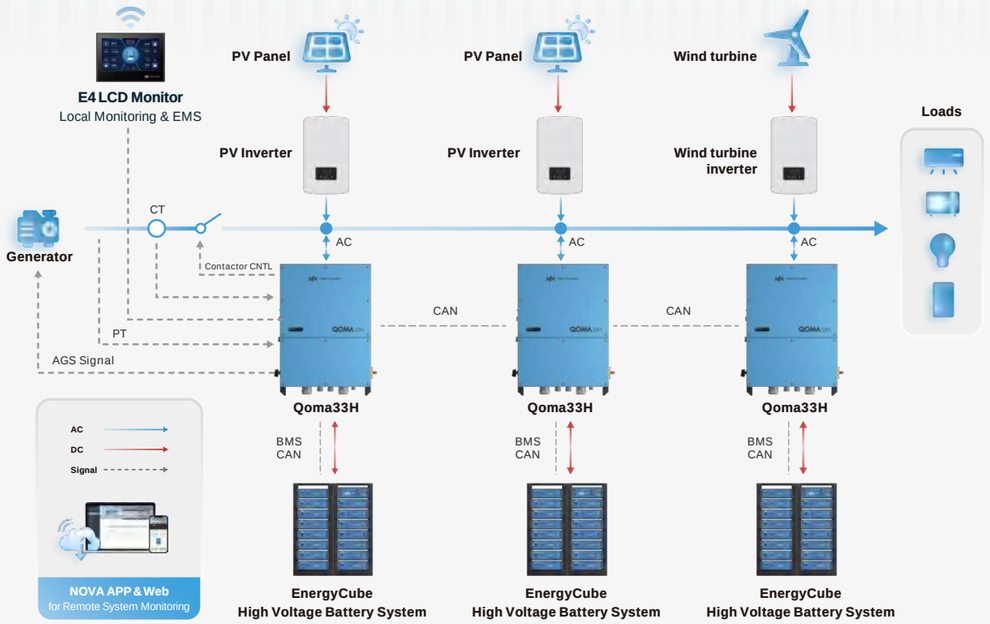
Solution Introduction

TBB Mini-grid system consists of electricity generators and energy storage systems interconnected to a distribution network that supplies electricity to a small, localized group of customers, typically serving remote communities that are not economical to connect to large grids due to their isolation, but have a sufficient density and diversity of end users so that it makes sense to connect them together rather than supply them all respectively with stand-alone systems.

TBB Mini-grid system plays a key role in the decentralized/ distributed energy generation segment, featuring modular design for easy system scale expanding, ranging from 33kW to 330kW to meet various scenarios demands. Households and businesses are guaranteed reliable, affordable energy supply through the utilization of renewable energy sources and energy storage technologies. It can run on diesel, solar PV and wind, generating a significant portion of their power from renewables, achieving energy independence to the utmost extent, securing energy supply without fear of power outages.

Highlights

- Applicable scenarios: remote villages, islands, mining areas, hotels, marine aquaculture, desert oasis and other areas without electricity
- Distributed control, modular and expandable for multiple parallel connections
- Support parallel and three-phase operation up to 10 devices, and directly carry loads without a transformer
- Support VSG function to ensure stable operation of the system
- Support 100% imbalanced loads and three-phase unbalanced adjustment
- Support 1.5 times overload for 30s, no derating at 45°C ambient temperature
- Built-in BMS, compatible with lithium battery and lead-acid, support battery heterogeneity (lead-acid and lithium battery), realize the maximum lifespan operation of the energy storage system
- Support all types of generator sets, with seamless switching among all modes
- Reduce fuel consumption more than 40%
- More than 98% comprehensive energy efficiency
- Suitable for mainstream single-phase/three-phase PV inverters, energy storage inverters, wind power inverters, etc.
- Reverse power protection for the largest PV power generation and fuel unit



Available Components for Mini Grid Solution

A wide range of products for you to choose >>>

/ Inverter

Qoma33H/Qoma33H-R

Power Conversion System

- 33kW
- Support parallel and three-phase operation up to 10 units (330kW)
- IP65 Protection

/ PV Inverter

PV Inverter

- Compatible with Solis & Goodwe PV inverters
- More brands to come as the compatibility list expands

/ Monitoring Device

MORE +

E7 LCD Monitor

Central LCD monitor

- For system's local control and monitoring
- Work with NOVA to realize system's remote monitoring

/ Battery

MORE +

LH75

High Voltage Lithium Battery Module

- 48V 75Ah 3.6kWh
- 6000 cycles 90% DOD

Energy Cube LH75

High Voltage Lithium Battery System

- 576V-720V | 43.2kWh-216kWh

/ All-in-one Cabinet

MORE +

Raython Model Q

All-in-one Mini Grid System

- 33kW | 43.2kWh~54kWh (90% DoD)

TBB Renewable

Commercial & Industrial ESS Solution

Solution Introduction

Commercial buildings, schools, factories, hospitals and other large consumers of electricity often encounter difficulties such as high investment in power systems and low returns and are subject to factors such as power overloaded, limited power capacity expansion, high electricity prices, and power security, which hinder the rapid development of their businesses.

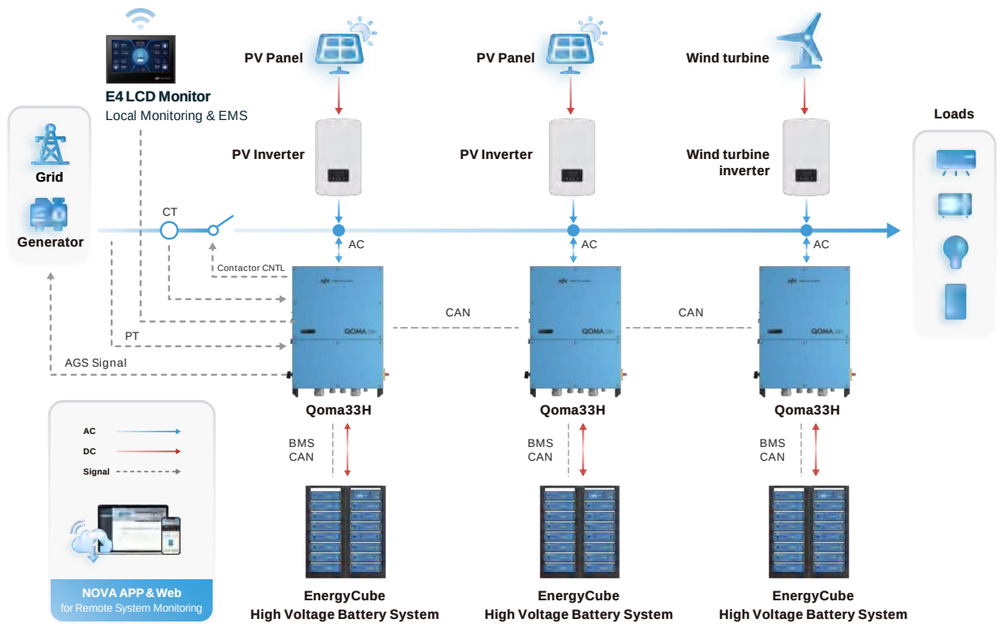
TBB commercial and industrial energy storage solution, adopts a modular system configuration, which flexibly matches various commercial and industrial scenarios, ranging from 33kW to 330kW, supports multi-mode operation, improves investment returns through maximizing their energy independence and reducing grid power demand with solar PV and battery storage. Even when the PV energy is insufficient in rainy days, they can also benefit from the ability of batteries to reduce peak power demand and shift grid consumption to off-peak hours, thus reducing their electricity bills and exposure to rising energy prices, generating additional revenues from renewable energy, and reduce their environmental impacts.

Solution Highlights

- AC -Coupling
- UPS ability
- On/off-grid ability
- High power density system, integrating PCS, battery system and EMS
- Safe and compact LiFePO battery
- Modular design for easy installation and operation, low maintenance
- Each PCS is equipped with ân independent EnergyCube battery pack to avoid uneven current flow between battery packs and improve system efficiency
- Time of use: support multi-stage charging and discharging settings to achieve higher peak and valley benefits
- Control various power response based on different battery SoC, to prolong battery life
- Multiple protection mechanisms: output over-current protection, short circuit protection, over-voltage protection
- Seamlessly enable battery backup power to provide continuous power to critical loads
- 24/7 local monitoring via E7 LCD Monitor
- 24/7 remote system monitoring through NOVA Web & App

33kW-330kW **Commercial & Indurstical**

PV Inverter: 30kW-300kW
Battery: 43.2kWh-2,160kWh
Inverter: 33kW-330kW



Available Components for C&I ESS Solution

A wide range of products for you to choose >>>

Inverter

Qoma33H/Qoma33H-R

Power Conversion System

- 33kW
- Support parallel and three-phase operation up to 10 units (330kW)
- IP65 Protection

PV Inverter

PV Inverter

- Compatible with Solis & Goodwe PV inverters
- More brands to come as the compatibility list expands

Monitoring Device

MORE +

E7 LCD Monitor

Central LCD monitor

- For system's local control and monitoring
- Work with NOVA to realize system's remote monitoring

Battery

MORE +

LH75

High Voltage Lithium Battery Module

- 48V 75Ah 3.6kWh
- 6000 cycles 90% DOD

Energy Cube LH75

High Voltage Lithium Battery System

- 576V-720V | 43.2kWh-216kWh

All-in-one Cabinet

MORE +

Raython Model Q

All-in-one Energy Storage System

- 33kW | 43.2kWh~54kWh (90% DoD)

Power Conversion System

Qoma SERIES

Qoma33H / Qoma33H-R **33kVA / 33kW**

Paralleled to 330kW three phase

Qoma series is a power conversion system which is suitable for mini-grid, off-grid systems, and grid-tied energy storage systems. It supports multiple energy input, such as wind, solar, diesel and grid and boasts 0ms UPS class transfer time to guarantee uninterrupted power supply for the system. With flexible configuration, it can be used in the fields like energy demand response management, grid support, load balancing, diesel hybrid and new energy generation and storage. The power supply mode is compatible with TN, TT and IT systems, and supports three-phase four-wire and three-phase three-wire power supply mode.

- Support up to 10 units in parallel
- Wide battery range, compatible with lithium and lead acid batteries
- Support independent battery bank or battery bank shared by multiple devices
- Support constant current, constant voltage and constant power charging
- Support constant current and constant power discharging
- Support 100% unbalanced load
- 1.5 times 30S overload capability
- Embedded EMS functionality, while supporting external EMS management
- LED+HMI
- Support system parameter configuration on the APP or upper computer
- Boast reverse polarity protection, overheat protection and overvoltage protection
- Support grid monitoring and ground fault monitoring
- Support insulation monitoring
- IP 65 protection index
- Possess relevant energy storage and grid connection certification

Model No.	Qoma33H	Qoma33H-R
Max. DC voltage (V)	850	
Min. DC voltage (V)	400	
DC voltage range for nominal power (V)	500~850	
Max. DC current (A)	62	
Max. DC power (kW)	34	

AC side (Grid)

AC output power	33 kVA @ 45°C / 30 kVA @ 50°C
Max. AC current (A)	50
Nominal AC voltage (V)	400/230
AC voltage range	-20%~15%
Nominal grid frequency / Grid frequency range (Hz)	50Hz: 47Hz-52Hz; 60Hz: 57Hz-62Hz
AC current THD	< 3 % (At nominal power)
DC current injection	0.5%
Power factor at nominal power / Adjustable power factor	> 1 leading -1 lagging
Adjustable reactive power	-100%~100%

AC side (micro- grid)

Nominal AC voltage (V)	400/230
AC voltage THD	< 1% (Resistance load)
Unbalance load capacity	100%
Nominal voltage frequency / Voltage frequency range (Hz)	50: 45~59.8; 60: 50.2~66
AC output power	45kW/30S

Effciency

Max. charge efficiency	98.0%

Protection

Reverse polarity protection	Yes	
DC switch	Yes	No
AC switch	Yes	No
Overvoltage protection	DC Type Ⅱ / AC Type Ⅲ	
Grid monitoring / Ground fault monitoring	Yes / Yes	
Insulation monitoring	Yes	
Overheat protection	Yes	

General Data

Dimensions (mm)	520 x 750 x 220	520 x 580 x 220
Weight (kg)	37	35
Installation	Wall mount	Rack mount
Degree of protection	IP65	
Operating ambient temperature range	-25 to 60° (> 45° derating)	
Allowable relative humidity range (non- condensing)	0~100 %	
Cooling method	Temperature controlled forced air cooling	
Max. operating altitude	4000m (> 3000m derating)	
Display	LED	
Self-consumption at stop (W)	< 10	
Communication	RS485 / Ethernet / CAN	
Communication protocol	Modbus-RTU / Modbus TCP CAN2.0B	
Compliance	IEC/EN62477-1, IEC/EN62040-1; EN61000-6-1Z-2/-3/-4; IEC62116+IEC 61727, NRS097-2-1	
Grid support	LVRT, active & reactive power control and power ramp rate control	

Raython Model 0/1

3-5kW | 5.04kWh-20.16kWh

Raython Model 2

8kW | 10.08kWh-20.16kWh

Raython Model 0/1/2

All-in-One Integrated System

For Off-grid & Residential ESS Applications

Raython Model 0/1 & Model 2

For Off-grid & Residential ESS Applications

The Raython Model 0/1 and Model 2 systems are all-in-one stand-alone solar power systems. They are ideal solutions designed for holiday houses or single-family houses that have no access to the grid power and have to use generators as their power supply. Raython Model 0/1 can be also used in residential ESS applications for areas with a stable grid but high electricity prices and need to maximize self-consumption with solar to save electricity bills.

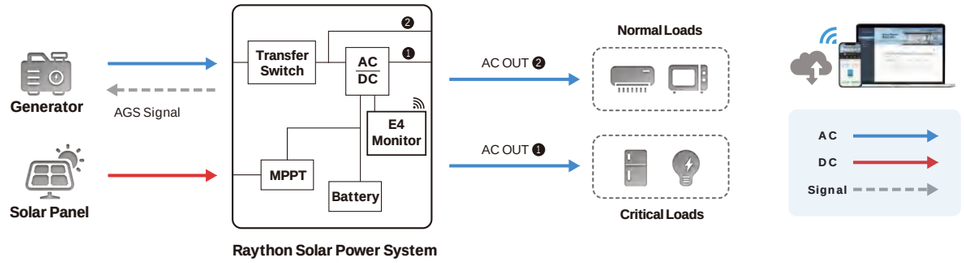
The Raython Model 0/1 and Model 2 systems are expertly assembled, tested and shipped as a complete system respectively, integrating a solar hybrid inverter (Model 0/1) or an inverter charger with an MPPT solar charge controller (Model 2), lithium battery modules, E4 LCD Monitor, and AC, DC and PV power distribution into one system. On arrival, the Raython system is ready and easy to install and the all-in-one design saves you precious time.

Our Raython Model 0/1 and Model 2 Solar Systems are designed for applications with a daily power use from 5.04kWh-20.16kWh, to meet your different power need.

Highlights

- All-in-one design for easy and quicker installation (<30 minutes)
- IP54 protection index for outdoor use;
- ECO-friendly: lower pollution, less noise and lower fuel consumption
- Factory assembled and tested system to ensure trouble-free installation
- Strong surge capability and powerful overload capability to power heavy loads like air-conditioner, water pump, fridge, washing machine, etc.
- Automatically start and stop the generator according to the load level, battery level or time period to ensure continuous power supply
- Leakage protect function on its AC output to ensure safety
- Its power assist function enables limited AC source to power heavy loads with the assist of battery power
- Boasts ESS capability to maximize self-consumption and save electricity bills (Model 0/1)
- NOVA Web & App for system remote monitoring and control E4 LCD Monitor for system local monitoring and control

System Schematic:



Raython Solar Power System

RAYTHON
MODEL 0/1

E4 LCD Monitor
- For system local monitoring and control

Solar Hybrid Inverter Apollo Matrix 3.0S/5.0S
- AC charger+Inverter+MPPT charger+ AC transfer switch (Model 0: 32A; Model 1: 50A)
- Max output power: 3000W (Model 0) / 5000W (Model 1)

Lithium Battery Module
- Model 0: 48V | 105Ah-210Ah | 5.04kWh-10.08kWh
- Model 1: 48V | 210Ah-420Ah | 10.08kWh-20.16kWh

AC+DC+PV Distribution

RAYTHON
MODEL 2

E4 LCD Monitor
- For system local monitoring and control

MPPT Charge Controller Solar Mate
- 150V 120A / 250V 100A

Inverter Charger Kinergier Pro 8.0S
- AC charger+Inverter+AC transfer switch (50A)
- Max output power 8000W

Lithium Battery Module
- 48V 210Ah-420Ah
- 10.08kWh-20.16kWh

AC+DC+PV Distribution

Model	Raython Model 0	Raython Model 1	Raython Model 2
AC input			
Generator compatible	Yes		
AC input voltage range(VAC)	175~265		
AC input frequency range(Hz)	45~65		
AC input current (transfer switch) (A)	50		
Inverter			
Product topology	Transformer based		
Nominal battery voltage (VDC)	48		
Input voltage range (VDC)	42~68		
AC output voltage(VAC)	220/230/240 ± 2%		
AC output frequency(Hz)	50/60 ± 0.1%		
Harmonic distortion	<2%		
Load power factor	1.0		
Cont.output power at 25°℃(VA)	3000	5000	6500
Max output power at 25°C (W)	3000	5000	8000
Peak power(W)	9000	15000	16000
Surge	300%		
Maximum efficiency	96%		
Zero load power (W)	17	21	26
Max AC charge current (A)	40	70	110
Main output (AC Out1) Current (A)	32	50	50
Transfer time	<2ms (<15ms in Weak AC source Mode)		
PV in			
Max output current(A)	60	90	120
Maximum PV power(W)	4000	6000	9000
PV open circuit voltage (V)	150		
Maximum PV short circuit current(A)	35	54	80
MPPT voltage range(V)	65~145		
MPPT charger maximum efficiency	98%		
MPPT efficiency	>99.5%		>99.9%
Battery			
Battery type	LiFePO4 Li-ion battery		
Nominal energy capacity	5.04kWh-10.08kWh	10.08kWh-20.16kWh	
General data			
General purpose com. port	Wi-Fi optional with E4 LCD monitor		
Operating temperature range	Inverter：-20˚C to 65˚C / Battery：discharge -20˚C to 55˚C, charge 0-40℃		
Relative humidity in operation	95% without condensation		
Altitude (m)	2000		
Mechanical Data			
Dimension（W*D*H） (mm) (max)	750*482*1130	750*650*1130	
Net Weight (kg) （without battery）	100	135	150
Cooling	Forced fan		
Protection index	IP54		
Standards			
Safety	EN-IEC 62477-1, EN-IEC 62109-1, EN-IEC 62109-2		EN-IEC 60950-1, EN-IEC 62109-2
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-3-11, EN61000-3-12		
Grid Code	NRS 097-2-1:2017, NTS 2.1 (A)*, RD 1699*		/

* Coming soon

All-in-One Integrated System

Raython System

Raython Parallel Kit

Raython series of the same model support parallel connection up to 3 cabinets to compose a single-phase or a three-phase system for power expansion. The table below lists the necessary parallel kits for parallel connection.

Model	Parallel Configurations	AC Distribution BOX	DC Parallel Kit
Raython Model 1	Parallel connection of 2 cabinets in a single-phase system	1*PDU-M2-3S	KIT-M1-2P
	Parallel connection of 3 cabinets in a single-phase system	1*PDU-M2-3S	KIT-M1-3P
	Parallel connection of 3 cabinets in a three-phase system	1*PDU-M2-3T	KIT-M1-3P
Raython Model 2	Parallel connection of 2 cabinets in a single-phase system	1*PDU-M2-3S	KIT-M2-2P
	Parallel connection of 3 cabinets in a single-phase system	1*PDU-M2-3S	KIT-M2-3P
	Parallel connection of 3 cabinets in a three-phase system	1*PDU-M2-3T	KIT-M2-3P

AC Distribution BOX

PDU-M2-3T 400V/63A

PDU-M2-3S 230V/125A

PDU-M2-3T

AC Distribution BOX

- For Raython Model 1 & 2 parallel connection in a three-phase system
- 400V/63A
- IP54
- Wall-mounted

PDU-M2-3S

AC Distribution BOX

- For Raython Model 1 & 2 parallel connection in a single-phase system
- 230V/125A
- IP54
- Wall-mounted

Model No.	PDU-M2-3T	PDU-M2-3S
Rated voltage (VAC)/ Frequency (Hz)	400VAC (50/60Hz)	230VAC (50/60Hz)
Rated current (A)	63	125
Inverter input circuit breaker	3xC Type, 2P, 50A	3xC Type, 2P, 50A
Inverter output circuit breaker	3xC Type, 2P, 50A	3xC Type, 2P, 50A
System input circuit breaker	C Type, 3P, 63A	C Type, 2P, 125A
Maintain Bypass Switch	C Type, 4P, 63A	C Type, 2P, 125A
System output circuit breaker	C Type, 3P, 63A	C Type, 2P, 125A
Surge protection device	In: 20kA (8/20μs), Imax: 40kA (8/20μs)	
AC input terminal	100A, 5AWG, M4 screw	135A, 2AWG, M6 screw
Wiring terminals for inverter input and output, PV inverter output	76A, 7AWG, M4 screw	
System output wiring terminal	100A,5AWG, M4 screw	135A, 2AWG, M6 screw
Ground copper bar	2*30*106mm, 8 holes (M6)	2*30*106mm, 8 holes (M6)
Temperature, altitude	-25℃～+60℃, 2000m (＞2000m derating)	
General data	Galvanized sheet, spray painted surface RAL9003, P54, Wall-mouted	
Dimensions/ weight	550*600*120mm,15kg	

DC Parallel Kit

KIT-M1-2P / KIT-M1-3P / KIT-M2-2P / KIT-M2-3P

/ Key Components of DC Parallel Kit

DC MCB

Copper terminal strip

M8 screw

System communication cable

BVR multi-core cable

KIT-M1-2P

For parallel connection of 2 cabinets of Raython Model 1

No	Item	Quantity	Unit
1	DC MCB, NDB6Z-125C125/2, 2P, type C	2	PCS
2	Copper terminal strip used for extending the phase line output of DC MCB	4	PCS
3	Screw, M8*15mm	8	PCS
4	System communication cable, PMBTC, UTP 4PR	2	PCS
5	Self-made power cable, BVR multi-core cable, 25mm², red, 330mm	2	PCS
6	Self-made power cable, BVR multi-core cable, 25mm², black, 240mm	2	PCS
7	Self-made power cable, BVR multi-core cable, 25mm², black, 3m	1	PCS
8	Self-made power cable, BVR multi-core cable, 25mm², red, 3m	1	PCS

Note: The above list is subject to change without prior notice, based on actual parallel configurations.

KIT-M1-3P

For parallel connection of 3 cabinets of Raython Model 1

No	Item	Quantity	Unit
1	DC MCB, NDB6Z-125C125/2, 2P, type C	3	PCS
2	Copper terminal strip used for extending the phase line output of DC MCB	6	PCS
3	Screw, M8*15mm	12	PCS
4	System communication cable, PMBTC, UTP 4PR	4	PCS
5	Self-made power cable, BVR multi-core cable, 25mm², red, 330mm	3	PCS
6	Self-made power cable, BVR multi-core cable, 25mm², black, 240mm	3	PCS
7	Self-made power cable, BVR multi-core cable, 25mm², black, 3m	2	PCS
8	Self-made power cable, BVR multi-core cable, 25mm², red, 3m	2	PCS

Note: The above list is subject to change without prior notice, based on actual parallel configurations.

KIT-M2-2P

For parallel connection of 2 cabinets of Raython Model 2

No	Item	Quantity	Unit
1	DC MCB, NDB6Z-125C125/4, 4P, type C	2	PCS
2	Copper terminal strip used for extending the phase line output of DC MCB	8	PCS
3	Screw, M8*15mm	16	PCS
4	System communication cable, PMBTC, UTP 4PR	2	PCS
5	Communication cable, UTP 2PR	1	PCS
6	Self-made power cable, BVR multi-core cable, 25mm², black, 450mm	4	PCS
7	Self-made power cable, BVR multi-core cable, 25mm², red, 450mm	4	PCS
8	Self-made power cable, BVR multi-core cable, 50mm², black, 3m	1	PCS
9	Self-made power cable, BVR multi-core cable, 50mm², red, 3m	1	PCS

Note: The above list is subject to change without prior notice, based on actual parallel configurations.

KIT-M2-3P

For parallel connection of 3 cabinets of Raython Model 2

No	Item	Quantity	Unit
1	DC MCB, NDB6Z-125C125/4, 4P, type C	3	PCS
2	Copper terminal strip used for extending the phase line output of DC MCB	12	PCS
3	Screw, M8*15mm	24	PCS
4	System communication cable, PMBTC, UTP 4PR	4	PCS
5	Communication cable, UTP 2PR	2	PCS
6	Self-made power cable, BVR multi-core cable, 25mm², black, 450mm	6	PCS
7	Self-made power cable, BVR multi-core cable, 25mm², red, 450mm	6	PCS
8	Self-made power cable, BVR multi-core cable, 50mm², black, 3m	2	PCS
9	Self-made power cable, BVR multi-core cable, 50mm², red, 3m	2	PCS

Note: The above list is subject to change without prior notice, based on actual parallel configurations.

Raython Model 3

24kW | Three-phase
40.32-60.48kWh (90% DoD)

Raython Model 3

All-in-one Integrated System

For Residential and Small Business
Off-grid and ESS Applications

Raython Model 3

The Raython Model 3 system is a three-phase all-in-one standalone solar power system, designed for large residential and small business premises that experience limited, interrupted, or no grid power. It also supports typical ESS applications such as peak shaving and energy self-consumption for those who face high electricity prices.

It can work with a generator set or be connected to the public grid, allowing the user to select the most favorable power source for specific load conditions at any given time and circumstances.

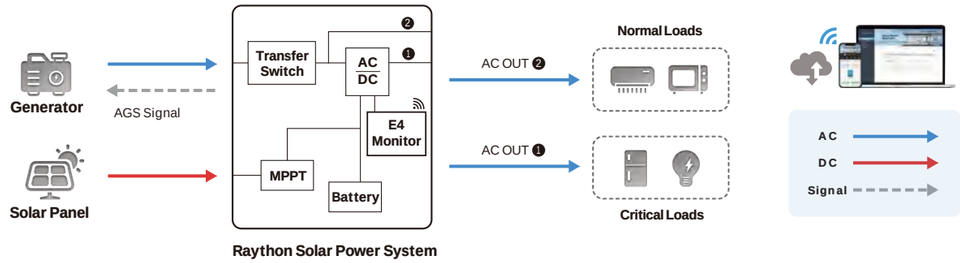
As a highly integrated system, the Raython Model 3 follows a simple, modular design, integrating three 8kW inverter chargers, three 600V MPPT solar charge controllers, 12 units 48V/5.04kWh lithium battery modules, an E4 LCD Monitor and power distribution units - all in an IP54-rated cabinet. Its components (except batteries) are pre-assembled to facilitate a convenient transportation of the whole system. Thanks to its all-in-one design, the Raython Model 3 is also easy to install on site, with a minimum of wiring.

Raython Model 3 can meet your different power needs with total capacity up to 60.48kWh. With low pollution, low noise pollution and low fuel consumption, Raython Model 3 is an Eco-friendly solution for sustainable and cost-effective living.

Highlights

- All-in-one highly integrated system for easy installation, transportation and O&M
- Integrated with high-voltage MPPT, allows for easy wire connections and reduce wiring costs
- Built-in 6 MPPT trackers to optimize your solar panel installation for maximum use of solar energy
- Plug-and-play connector for fast conneciton between AC input and AC output
- Leakage protection on its AC output to ensure safety
- 0-2ms UPS-level transfer switch
- IP54 protection degree, ideal for outdoor installation
- ESS capability: maximize self-consumption, peak shaving, time of use, bills saving
- Easy to power heavy loads: transformer-based design, strong surge capability and powerful overload capability
- Two AC outputs: one uninterruptible output, one programmable output for load management
- AGS function: automatically start and stop the generator based on the load level, battery level or time period to ensure continuous power supply
- Power assist function enables limited AC source to power heavy loads with the assist of battery power
- Remote monitoring and control via NOVA Web & App
- Local monitoring, control and EMS via E4 LCD Monitor

System Schematic:



RAYTHON
MODEL 3

MPPT Charge Controller Solar Mate
- 600V 120A each

E4 LCD Monitor
- For system local monitoring and control

Inverter Charger Kinergier Pro 8.0S
- Max output power 8000W each

RAYTHON
MODEL 3

Lithium Battery Module
- 48V 40.32kWh-60.48kWh
- 5.04kWh each, support 8~12 units

Model	Raython Model 3

AC input

Generator compatible	Yes
AC input voltage range(VAC)	Three phase 305~460
AC input frequency range(Hz)	45~65
AC input current (transfer switch) (A)	50

Inverter

Product Topology	Transformer based
Nominal battery voltage (VDC)	48
Input voltage range (VDC)	42~68
AC output voltage(VAC)	220/380,230/400,240/415 ±2%
AC output frequency(Hz)	50/60 ± 0.1%
Harmonic distortion	<2%
Load power factor	1.0
Cont.output power at 25°C(VA)	19500
Max output power at 25°C (W)	24000
Peak power(W)	54000
Surge	300%
Maximum efficiency	96%
Zero load power (W)	78
Max AC charge current (A)	330
Main output (AC Out1) Current (A)	50 (per phase)
Transfer time	<2ms (<15ms in Weak AC source Mode>

PV in

Max output current(A)	120
Maximum PV power(W)	8000*6 (6 MPPT trackers)
PV open circuit voltage (V)	600
Maximum PV short circuit current(A)	20+20
MPPT voltage range(V)	80~525
MPPT charger maximum effiency	97%
MPPT efficiency	>99.9%

Battery

Battery type	LiFePO4 Li-ion battery
Nominal energy capacity	40.32kWh-60.48kWh

General data

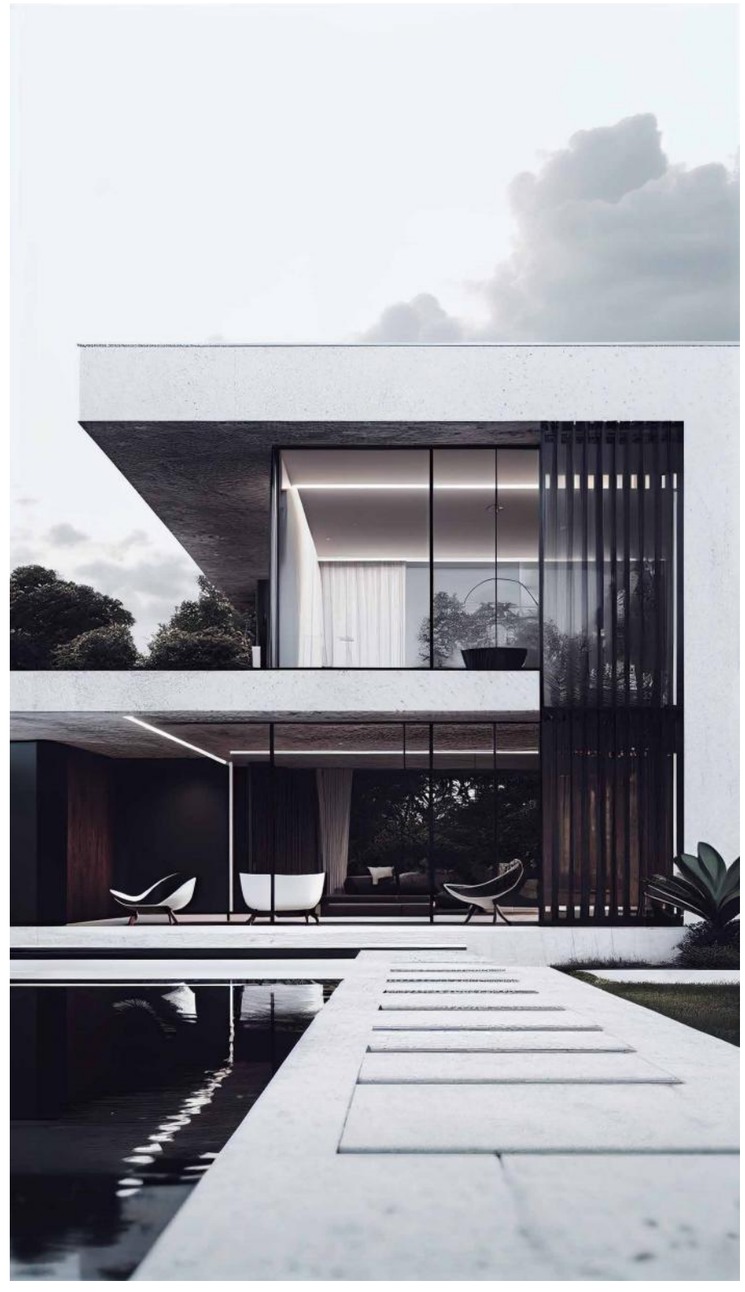
General purpose com. Port	Wi-Fi optional with E4 LCD monitor
Operating temperature range	Inverter：-20°C to 65°C / Battery：discharge -20°C to 55°C, charge 0-40°C
Relative humidity in operation	95% without condensation
Altitude (m)	2000

Mechanical Data

Dimension（W*D*H） (mm) (max)	1300*860*2060
Net Weight (kg) （without battery）	432
Cooling	Forced fan
Protection index	IP54

Standards

Safety	"EN-IEC 62477-1, EN-IEC 62109-1,EN-IEC 62109-2"
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-3-11,EN61000-3-12



Raython Model Q

All-in-one ESS Solution

For Mini-grid and Industrial & Commercial ESS Applications
33kW 43.2kWh~54kWh (90% DoD)

Highlights

- Modular design, expandable up to 330kW, 1.08MWh (10 units)
- All-in-one design for easy installation and low maintenance
- 24/7 local monitoring and control on E7 LCD Monitoring
- System remote monitoring on NOVA App & Web
- Factory assembled and tested system enables you get free from complicated groundwork

Note:

1. Raython Model Q supports one more group of EnergyCube LH75 batteries (up to 54kWh).
2. When two or more Raython Model Q are to be connected in parallel, an additional AC distribution cabinet is required for parallel operation.

RAYTHON
MODEL Q

Qoma 33H-R **E7 LCD Monitor**

- PCS
- 33kW

PDP-Q1

- AC Distribution Box
- Communication Transfer Board

BCU100

- LH75 Battery Controller

LH75 High Voltage Lithium Battery Module

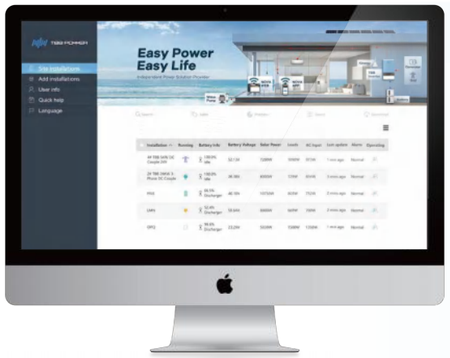
- 3.6kWh each
- Support 12~15 units LH75 connected in Series

Model NO.	Raython Model Q
System Specification	
Nominal Output Power	33kW
Maximum AC Input Power	33kW
Battery Capacity Range	43.2kWh~54kWh (90% DoD)
Battery Chemistry	LiFePO4
IP Protection	IP20
Cabinet Dimension(W *D* H)	1300*700*2000
Cabinet Weight	TBD
Warranty	3 years product warranty, 10 years performance warranty
Inverter Technical Specification	
Model	Qoma33H-R
Battery Voltage Range	400~850V
Max. Charging/ Discharging Current	62A
AC Side (Grid)	
Nominal Output Power	33kVA@45℃, 30kVA@50℃
Nominal AC input Current	50A
Nominal AC Voltage/ AC Voltage Range	400V/230V, -20%~15%
Nominal Grid Frequency/Frequency Range	50Hz: 47Hz~52Hz; 60Hz: 57Hz~62Hz
AC Current THD	< 3 % (at nominal power)
Power Factor at Nominal Power /Adjustable Power Factor	> 1 leading –1 lagging
Adjustable Reactive Power	-100%~100%
AC Side (Micro-Grid)	
Nominal AC Voltage	400V/230V, -20%~15%
AC Voltage THD	< 1 % (Resistance Load)
Unbalance Load Capacity	1
AC Output Power	45kW/30s
General	
Maximum Charge Efficiency	0.98
Reverse Polarity Protection	Yes
Overvoltage Protection	DC Type Ⅱ / AC Type Ⅲ
Grid Monitoring /Ground Fault Monitoring	Yes/ Yes
Insulation Monitoring	Yes
Overheat Protection	Yes
Degree of Protection	IP65
Operating Ambient Temperature Range	-25 to 60 ° (> 45 ° de-rating)
Allowable Relative Humidity Range (non- condensing)	0 –100 %
Cooling Method	Temperature controlled forced air cooling
Max. Operating Altitude	4000 m (> 3000 m de-rating)
Safety	IEC/EN62477-1，IEC/EN62040-1
EMC	EN61000-6-1/-2/-3/-4;
Grid Regulation	IEC62116，IEC61727, NRS097-2-1
Grid Support	LVRT, Active & Reactive Power control and power ramp rate control
Lithium Battery Technical Specification	
Module Model	LH75
Module Capacity	3.6kWh
Module Nominal Voltage	48VDC
Operating Temperature Range	-10 ℃ ~+55 ℃
Maximum Charging /Discharging Current	37.5A/37.5A
Safety	IEC62619
EMC	EN61000-6--2/-4;
Battery Modules	12~15 LH75 in Series

TBB NOVA APP & Web

Monitor and Control Your Solar System Anywhere Anytime

NOVA App and NOVA Web are FREE energy management and monitoring system designed by TBB Renewable, displaying real-time data of all system components and history records, providing easy access to controlling the power generation and power consumption. According to historical data, users can actively adjust and optimize power consumption habits.



Devices for remote monitoring communication

Ether-Link

E4 LCD Monitor

Kinergy II-WiFi
Wireless Data Logger

Comprehensive Monitoring

- Live data and status overview and system analysis
- System configuration and parameter setting
- Customizable alarm setting
- Detailed report for power harvest, storage and consumption in visual chart and graph
- WEB compatible for Windows and Mac PC
- APP available for Android and iOS phone

Intelligent Management for Dealers / Installers

- Comprehensive management for multiple installations
- Catch potential issues early with alarm setting to prevent system failure
- Optimize the energy harvest and usage with history graphs and detailed analytical reports
- Proactive maintenance services to keep good relationship with customers
- Customizable banner to show dealers information and slogan

Android **iOS**

nova.tbbrenewable.com

TBBLink

Configuration tool for TBB Inverters and PCS

TBBLink is a perfect PC tool for installers to quick configure, update and diagnose TBB inverters. It applies to the following TBB products: RiiO Sun II, Kinergier Pro CK-II, Tyrann, Apollo Matrix, Matrix II, Ingesola and Qoma33H/H-R.

Highlights

- User-friendly and intuitive interface for easy and quick configuration
- Provide quick fault diagnosis by showing current fault information and running information in a clear and intuitive manner
- Support saving and importing settings for batch configuration next time, to save configuration time
- Support quick and smart configuration for parallel and three-phase systems

TBB Inverter

TBBLink on the Host Computer

The TBBLink should be installed on a computer and connect to the inverter via TBB interface before performing the configuration; When configuring the TBB PCS, TBBLink on the host computer can connect to the PCS directly via RJ45 cable.

MPPT Solar Charge Controller

Solar Mate

SP600-120: 600V 120A

The SP600-120 is TBB's latest solar charge controller with up to 600VDC PV open circuit voltage and 120A charge current, used for charging 48VDC battery banks. It is an ideal solution for larger on-grid and off-grid solar systems which require higher battery charging power.

Featuring high open-circuit voltage and a wide 80-525V MPPT tracking, it can save your configuration and installation cost of the combiner box, thus greatly minimizes the system cost. With two independent tracking trackers, you can optimize your solar panel installation for maximum use of solar energy.

- High open-circuit voltage, 80~525V wide-range MPPT tracking
- Two independent MPPT trackers to optimize the PV panel installation and maximize the use of solar energy
- Features high-voltage isolation, to realizes electrical isolation at reinforced insulation level between the PV side and the battery, improving electrical safety
- Built-in PV array insulation resistance detection (earth fault detection)
- Support parallel connection up to 15 units
- Intelligent communication monitoring interface: 1XRS485, 1XCAN
- High power density and compact design, saving installation space
- Intelligent fan control to minimize noise
- When working with TBB inverters, SP600-120 can be remotely monitored and controlled via TBB NOVA APP & Web

*Note: Currently SP600-120 is exclusively compatible with the Kinergier Pro CK-II and Tyrann inverters.

Model No.	SP600-120
Charger	
Battery voltage	48V
Maximum charge current (A)	120
Maximum charge Power	7000W @ 57.6V total 5000W @ 57.6V per tracker
Charge voltage 'absorption' (V)	Default: 57.6
Charge voltage 'float' (V)	Default: 54.0
Charger voltage range (V)	40-60
Battery types	AGM / GEL / OPzV / Lead-Carbon / Lithium
Battery temperature sensor	Included
Maximum efficiency	97.0%
Self consumption	80mA @ 48V
Solar	
Maximum PV open circuit voltage (V)	600
Start-up voltage (V)	120
PV operating voltage range (V)	120-525
MPPT voltage range (V)	80-525
Number of MPPT trackers	2
Maximum PV input current per tracker (A)	18 + 18
Maximum PV short circuit current per tracker (A)	20 + 20
Maximum PV power per tracker (W)	8000 + 8000
MPPT efficiency	>99.9%
PV array insulation resistance detection (Earth fault detection)	Integrated
General data	
Surge Protection	Yes
Protection	a) battery voltage too high. b) battery voltage too low. c) temperature too high. d) PV reverse polarity
Dry In port	1x
Programmable relay	1x (28Vdc/4A or 250Vac/2A)
General purpose com. Port	RS485
Operating temperature range	-20°C to 65°C
Relative humidity in operation	95% without condensation
Altitude (m)	3000
Mechanical Data	
Dimension (mm) (max)	484*280*108
Net Weight (kg)	7.8
Cooling	Forced fan
Protection index	IP21
Standards	
Safety	EN-IEC 62109-1,EN-IEC 62109-2
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3

MPPT Solar Charge Controller

Solar Mate

250V **100A / 70A**

150V **120A / 80A / 60A**

100V **30A / 50A**

Solar Mate is a solar charge controller with built-in Maximum Power Point Tracking (MPPT) technology, which enables it to increase its PV output by as much as 30% compared with non-MPPT designs.

Solar Mate can optimize the PV's output and eliminate the fluctuation due to shading or temperatures variables. It is a multi-voltage MPPT with built-in sophisticated battery charging algorithm for both lead acid battery or lithium-ion battery, suitable for various system designs. Meantime, it supports data management of 365-day history records, which can tell users the system's actual performance.

- High dynamic MPPT efficiency more than 99.9%
- High efficiency up to 98%, and European weighted efficiency up to 97.3%
- Up to 7056W of charging power at 40℃
- Excellent performance at sunrise and low solar insulation levels
- Wide MPPT operating voltage range
- Parallel function, up to 6 units can be operated in parallel
- Built-in TBB premium ll battery charging algorithm for lead acid battery
- Support 365days Data logging
- Communication: Auxiliary contact, RS485 support\T-bus

Model No		SP100-30-BT	SP100-50-BT	SP150-60	SP150-80	SP150-120	SP250-70	SP250-100
Electrical								
Nominal battery voltage (VDC)		12, or 24		24 or 48				48
Maximum charging current (A)		30	50	60	80	120	70	100
Maximum charging power (W)	12VDC	441	735	N/A				
	24VDC	882	1470	1764	2352	3528	2058	N/A
	48VDC	N/A	N/A	3528	4704	7056	4116	5880
Maximum PV input power (W)	12VDC	500	800	N/A				
	24VDC	1000	1600	2250	3000	4500	2700	N/A
	48VDC	N/A	N/A	4500	6000	9000	5400	7500
PV open circuit voltage (Voc) (VDC)		100		150			250	
MPPT voltage range (VDC)		(Vbat+6VDC)~90VDC		65~145			65~245	
Max. PV short circuit current (A)		30	50	40	80			
Max efficiency		≥97%		98%@48VDC system				
Max MPPT efficiency		≥99.9%						
Self-consumption (mA)		Less than 1mA@12VDC/ 3mA@24VDC		37mA @ 48VDC system				
Charge voltage 'absorption' (VDC)		Default setting: 14.1/28.2		28.8/57.6			57.6	
Charge voltage 'float' (VDC)		Default setting: 13.5/27		27/54			54	
Charging algorithum		TBB ll multiple stages						
Temperature compensation		Default setting: -3mV/℃/cell						
Equalization charging		N/A		Programmable				
Other								
Display		LED indicator		LED+LCD				
Communication port		RS485, CAN, Bluetooth		RS485				
Dry contact		N/A		30Vdc/2A				
Remote on / off		N/A		Yes (2 pole connector)				
Data logging		365-day historical records, including daily, monthly, annual power generation, total power generation records, historical operation event records, user operation logs, etc.		365 days of history record,daily,monthly and total production;Real time figure including solar array voltage,battery voltage,charging current,charging power; Record the daily PV start charging time,absorb to floating transfer time,PV power loss time and etc; Real time fault time and information.				
Storage temperature		-40℃~70℃						
Operating temperature		-40℃~70℃ (power derated over 40℃)		-25℃~60℃ (power derated above 40℃)				
Humidity		5%~95%, non-condensing						
Altitude		3000m (full rated output up to 2000m)						
Max wire sizes (mm^2)		16		35				
Protection category		IP20		IP21				
Dimension (L*W*H) - mm		199*160 *74	199*160 *94	325.2*293*116.2				352.2*293 *116.2
Weight (kg)		1.4	1.85	6.8	7.0	7.2	7.0	7.8
Cooling		Natural cooling						Forced fan
Standard		UL1741, ECE-R10, IEC62109-1, EN61000-6-1, EN61000-6-3		EN61000-6-1,EN61000-6-3, EN62109-1				

PV Array Insulation Resistance Detection

IRD300

Ground Fault Detection

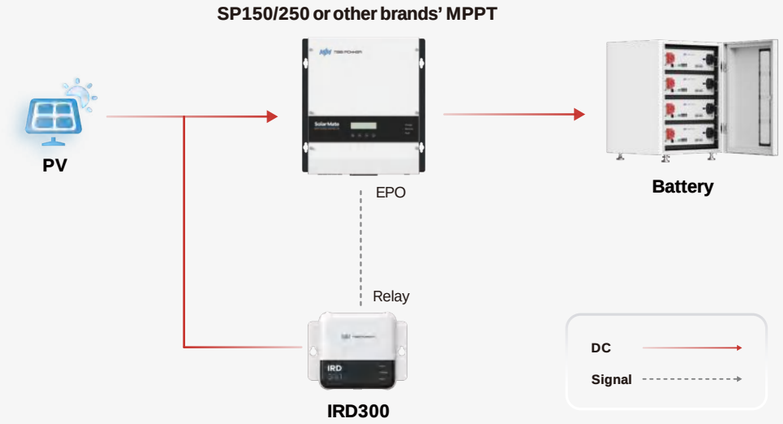
The IRD300 PV array insulation resistance detection (also called earth fault detection) satisfies the need for detecting abnormal PV array (open-circuit voltage range: 60-300V) insulation resistance to ground, with a high compatibility to work with non-isolated solar charge controllers. When abnormal PV array insulation resistance to ground is detected, the fault indication will be presented by means of: 1) the alarm indicator light on the device, 2) fault reminder sent via RS485 communication, or 3) an alarm relay output.

- Sourcing auxiliary power directly from the PV array under detection, no external adapter needed
- Suitable for a single PV array or two arrays
- Built-in with an alarm relay output, fit for applications without communication, like working with TBB SP150 and SP250 and other brands' MPPT solar charge controllers
- Support RS485 communication, applicable to TBB Solar Hybrid Inverters
- Compact and lightweight design for easy installation and wiring

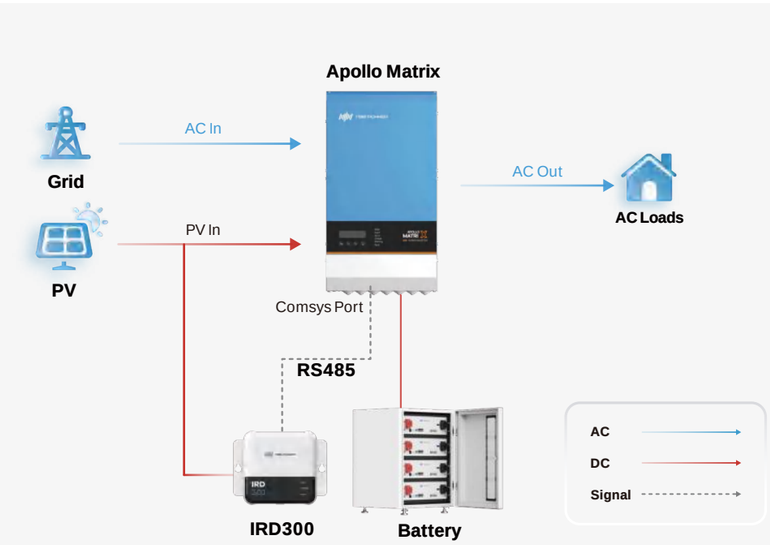
Model No.	IRD300
Solar	
PV array monitoring range	60 – 300VDC
General Data	
Aiarm indication relay	1x (30Vdc/3A or 250Vac/3A)
General purpose com. Port	RS485
Operating temperature range	-20˚C to 65˚C
Relative humidity in operation	95% without condensation
Altitude	3000m
Mechanical Data	
Dimension	85mm*85mm*35mm
Net weight	0.20kg
Cooling	Natural cooling
Protection index	IP21
Standards	
Safety	AS/NZS 3100
EMC	AS/NZS 61000.6.3

Application

Work with TBB SP150 and SP250 or other brands' MPPT solar charge controllers without communication



Work with TBB all-in-one solar inverter series through RS485 communication



E4
LCD Monitor

4.3 inches

TBB E4 is an intelligent central LCD touch monitor, providing intuitive, local and real-time control and monitoring for all TBB off-grid systems and energy storage systems. Meanwhile, it can connect the system to the TBB NOVA online portal to monitor the system remotely.

Features

- Powerful local monitoring unit, displaying plentiful, and real-time running data and status of systems
- Time of Use: intelligent scheduling of energy from solar, battery, and grid/generator, control the charging and discharging of the system to achieve optimal management of system energy
- Support communication with an energy meter, and support monitoring the operation data of any brand of PV inverter via the energy meter
- Available graphs to view energy statistics by day, month, year
- Support 2,000 historical event records and 400 operation records
- Support USB Host and support data export and storage with U disk
- Compatible with NOVA online portal, connect to TBB NOVA Online Portal through Wi-Fi to realize remote monitoring and control, setting and upgrading
- Data logging: when it is connected to the internet, all data is sent to the NOVA online portal. When the internet connection is not available, the E4 LCD Monitor will store the data internally up to 7days; when the internet connection restores, the data can be uploaded to the NOVA Online Portal again.
- Support communication with lithium battery and comprehensive lithium battery monitoring function
- AGS control function, intelligently control the start and stop of a generator, and monitor the running status and time of the generator
- Intelligent load control based on SoC and time
- Intelligent configuration of three-phase or parallel system

E4 LCD Monitor

Home Overview

Generator AGS Control Setting

AC Out 2 for intelligent load control

Working Mode Setting: Zero export to load, Zero export to CT and Selling first

Time of Use: intelligent scheduling of energy from solar, battery, and grid/generator

Available curve chart to dynamically display the change of load power

Model NO.	E4 LCD Monitor

LCD Parameters

Size	4.3 inches
Display screen size	95.04mm*53.86mm
Resolution	480×272 pixels
Backlight	LED
Luminance	400 cd/m²
Viewing angle	80°
Touch technology	Capacitive Touch
Touch points	Support 5-point touch
Aspect ratio	16:9

Electrical Parameters

Nominal input voltage (VDC)	12
Input voltage range (VDC)	9~16
Operating current (mA)	100
Peak current (mA)	250
Internal communication port	RS485
Energy meter communication port	RS485
Lithium battery communication port	CAN
External communication	Wi-Fi/RS485

Other parameters

Dimension (mm)(L*W*H)	115*80*38mm
Net weight (g)	178
Operating temperature	-20℃~+70℃
Storage temperature	-30℃~+75℃
Operating humidity	85% without condensation
Protection category (IP Rating)	IP21
Standard	CE

TBB E7 is an intelligent central LCD touch monitor, providing intuitive, local and real-time control and monitoring for TBB mini-grid systems as well as commercial and industrial energy storage systems. Meanwhile, it can connect the system to the TBB NOVA Online Portal to monitor the system remotely.

E7
LCD Monitor

7 inches

Features

- Powerful local monitoring unit, displaying plentiful, and real-time running data and status of systems
- Time of Use: intelligent scheduling of energy from solar, battery, and grid/generator, control the charging and discharging of the system to achieve optimal management of system energy
- Support communication with an energy meter, and support monitoring the operation data of any brand of PV inverter via the energy meter
- Available graphs to view energy statistics by day or month
- Support alarm records and operation records
- Support USB Host and support data export and import with U disk
- Support communication with TBB NOVA Online Portal through Wi-Fi to realize remote monitoring and control, setting and upgrading
- Data logging: when it is connected to the internet, all data is sent to the NOVA Online Portal. When the internet connection is not available, the E7 LCD Monitor will store the data internally up to 7days; when the internet connection restores, the data can be uploaded to the NOVA Online Portal again
- E7 supports monitoring and configuring TBB Qoma 33H/H-R and EnergyCube LH75

Model NO.	E7 LCD Monitor

LCD Parameters

Size	7 inches
Display screen size	154.21mm*85.92mm
Resolution	1024×600 pixels
Backlight	LED
Luminance	250 cd/m²
Viewing angle	180° (IPS Panel)
Touch technology	Capacitive Touch
Touch points	Support 5-point touch
Aspect ratio	16:9

Electrical Parameters

Nominal input voltage(VDC)	12
Input voltage range(VDC)	10~16
Operating current (mA)	300
Peak current (mA)	450
Internal communication port	RS485
Energy meter communication port	RS485
Lithium battery communication port	/
External communication	Wi-Fi or CAN

Other Parameters

Dimension (mm) (LxWxH)	180x115x33.8
Net weight (g)	440
Operating temperature	-20℃~+70℃
Storage temperature	-30℃~+75℃
Operating humidity	85% without condensation
Protection category (IP Rating)	IP21
Standard	CE

Data logging stick

Wireless Datalogger

Kinergy II-WiFi

Available with Wi-Fi version, wireless data logger is an external communication device connected to the TBB inverter through DB9 interface. Through NOVA Web or APP, it offers a convenient way to monitor the system performance remotely.

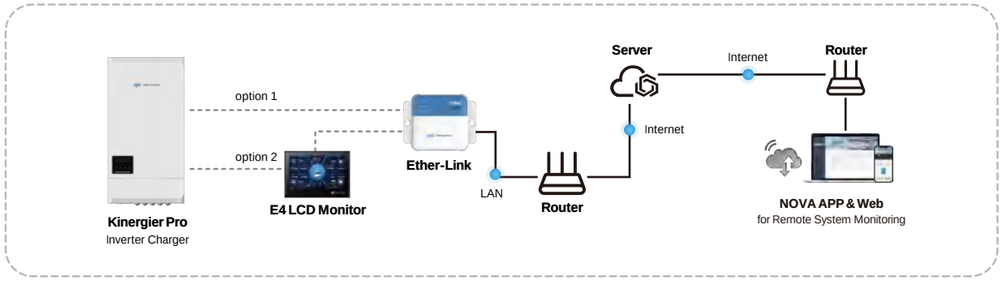
The Kinergy II-WiFi module is widely applied with most inverter series and MPPT charger of TBB, such as: RiiO Sun II, Apollo Matrix, Kinergier Pro CK-II, Tyrann, Matrix II, and Ingesola. The Kinergy II-WiFi supports BLE-config via APP to facilitate an easy and stable Internet connection, and it also supports Wi-Fi Protected Setup (WPS) to simplify the process of Wi-Fi connection without selecting network name (SSID) and entering password (router with WPS feature is required).

Model No.	Kinergy II-WiFi
Other Data	
Nominal input voltage (VDC)	12
Input voltage range (VDC)	4.5~18
Communication port	DB9
Internal communication port	RS485 and CAN
Antenna type	External
Operating temperature	-20°C~+60°C
Storage temperature	-40°C~+85°C
Dimension (mm)	60x32.3x143
Weight (g)	56
Protection category	IP65
Standard	CE, RoHS
Wi-Fi Module	
Operating current (mA)	< 250
Peak current (mA)	320
External communication port	Wi-Fi
BT Module	
Version	Bluetooth 5
Dormant current(uA)	18
Antenna gain (Dbi)	2
External communication port	Blue Tooth

Ether-Link

Similar to Kinergy, Ether-link is specially designed for transmitting the real-time running data and history records of TBB systems to TBB NOVA Web and APP for system monitoring and control purpose, yet it connects to the Internet via cable. It is integrated with a 10/100Mbps Ethernet interface for connecting to a router, and a TBB standard communication interface to communicate with your TBB products or systems. It is based on ARM Cotex M4 core with up to 144MHz bus frequency and supports industrial-grade operating temperature range, perfectly satisfying the demands for high communication reliability and security.

- Supports 10M/100M bps Ethernet communication
- Compliant with the standard IEEE 802.3 flow control for full duplex operation
- Compliant with the CSMA/CD protocol for half duplex operation
- Works well with NOVA APP and Web, providing an easy access to the system real-time data and system remote control, improving user experience



Model No.	Ether-link
Ethernet Performance	
Bandwidth(Mbps)	10/100
Standards Compliance	IEEE 802.3-2008, IEEE 1588-2008
Communication Port	RJ45
Acceleration	TCP/IPHardware Acceleration
Electrical	
Operating Voltage Range(V)	9~16
Operating Current Range(mA)	5~250
Power Supply	12V 500mA (stable DC power source)
Other	
Operating Temperature Range (°C)	-30~75 (voltage at 12V, humidity at 60%)
Storage Temperature Range (°C)	-40~85
Operating Altitude (m)/Relative Humidity	5000m,10%~85%
Protection Category	IP20
Weight (kg) / Dimensions(mm)	0.2kg, 108.6*84.92*40.3mm
Standards	CE

Lithium Battery Pack

Power Stack 5/10

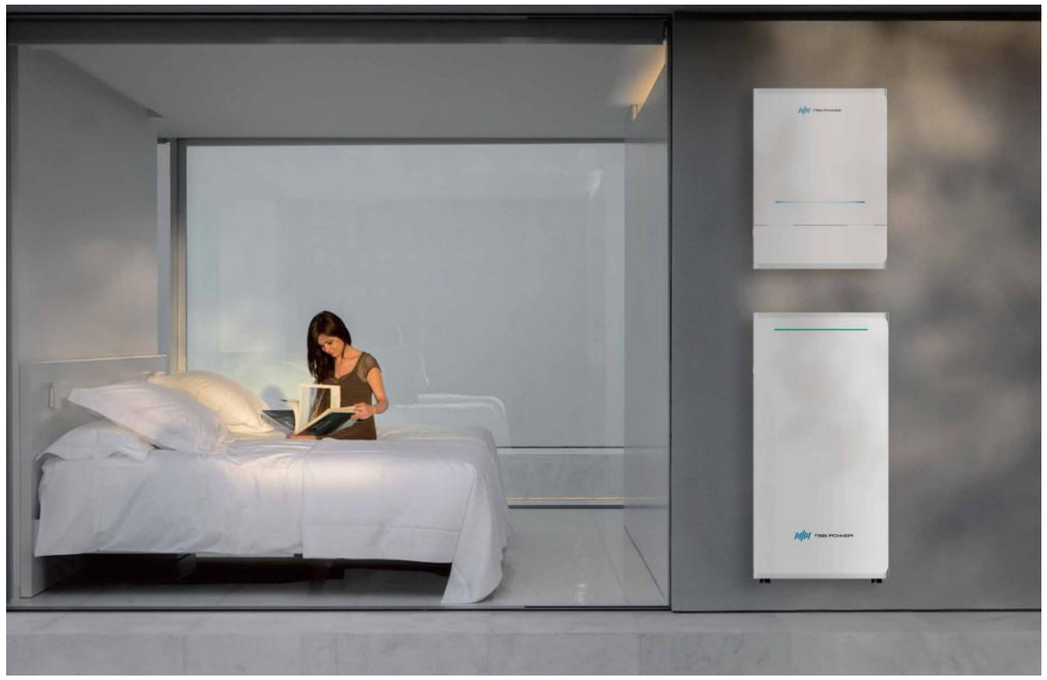
PS10 **48V 210Ah 10.08kWh**

PS5 **48V 105Ah 5.04kWh**

Power Stack 5/10 is TBB's latest 48V lithium battery pack. With high energy density, good compatibility, compact design and long cycle life, it is a perfect solution for residential and small commercial applications.

Besides floor-mounted installation, Power Stack 5/10 also supports wall-mounted installation to save your valuable space. Thanks to the modular design, its capacity can be flexibly expanded through parallel connection, meeting the demand of various scenarios. With IP65 protection, it is suitable for both indoor and outdoor operation. The battery real-time status can be locally monitored via E4 LCD Monitor and remotely monitored via NOVA APP & Web.

- Large capacity, high power output
- Safest lithium iron phosphate battery cell with high energy density
- Modular design: Power Stack 5 supports up to 32 units in parallel and Power Stack 10 supports up to 16 units
- Compact and wall-mounted design, saving installation space
- High integration, saving installation cost and simplifying the wiring
- Comes with mounting bracket for easy installation, and handles on the both sides for convenient carrying
- Built-in circuit breaker for over-current protection
- IP65 protection for both indoor and outdoor use
- Perfect compatibility: support CAN & RS485 communication with mainstream inverters
- Local monitoring via E4 LCD monitor
- Remote monitoring via NOVA APP & Web



Model	Power Stack 5	Power Stack 10
Nominal Voltage (V)	48	48
Work Voltage Range (V)	42~54.75	42~54.75
Nominal Capacity (Ah)	105	210
Nominal Energy (kWh)	5.04	10.08
Nominal Power (kW)	2.52	5.04
Max Power (kW)	5.04	10.08
1S Peak Power (kW)	5.76	11.52
1S Peak Current (A)	120	240
Charging Current (A)	52.5	105
Maximum Charging Current (A)	105	210
Discharging Current (A)	52.5	105
Maximum Discharging Current (A)	105	210
Cycle Life	90%DOD，6000 cycles life	90%DOD，6000 cycles life
Operating temperature	Discharge: -20℃~55℃	Discharge: -20℃~55℃
	Charge: 0℃~55℃	Charge: 0℃~55℃
Recommended Operating Temperature	Discharge: 15℃~30℃	Discharge: 15℃~30℃
	Charge: 15℃~30℃	Charge: 15℃~30℃
Storage Temperature	Storage: 0℃~35℃	Storage: 0℃~35℃
Altitude (m)	<2000	<2000
Humidity	15%~90%	15%~90%
Cooling method	Natural cooling	Natural cooling
Protection Degree	IP65	IP65
Dimension (mm) (W*D*H)	484*155*750	484*155* 995
Weight (kg)	55	96

Lithium Battery Module

ES100 II

48V 105Ah 5.04kWh

ES100 Ⅱ is the latest 48V 105Ah lithium battery module provided by TBB Renewable, designed for backup power system, solar off-grid system, and residential, industrial & commercial energy storage systems, with good compatibility, high energy density, fashionable design and safe long cycling life. Designed with the functionality to automatically assign the communication address of the slave modules, ES100 Ⅱ greatly simplies the parallel connection process.

- Safe lithium iron phosphate battery cell with high energy density, compact design
- Support up to 32 modules in parallel
- Automatically assign the communication address of the slave modules, easy to install
- Support short-time high-current charge and discharge
- Advanced high capacity, 90% DOD and 6000 cycles life
- Support external CAN communication, compatible with leading inverter brands
- Integrated with RS485 communication port, supports RS485 communication with TBB inverters
- Universal positive and negative terminals, convenient for users to install
- Coming standard with 300A parallel bus bar
- Available with simple mounting brackets and RACK cabinet with IP65 protection grade
- Equipped with intelligent BMS for each battery pack to manage modules effectively
- Practical pull ear design improves operation convenience

Optional Accessories

Simple Mounting bracket

PDP-ES
(For power distribution)

IP65 Power Rack Cabinet

Model	ES100 II
Nominal Voltage(V)	48
Work Voltage Range(V)	42~54.75
Nominal Capacity(Ah)	105
Nominal Energy(kWh)	5.04
Max Power(kW)	5.04
2S Peak Power(kW)	5.76
2S Peak Current(A)	120
Charging Current(A)	52.5
Maximum Charging Current (A)	105
Discharge Current (A)	52.5
Maximum Discharging Current (A)	105
Cycle life	90%DOD，6000 cycles life
Operating temperature	Discharge：-20℃~+55℃
	Charge：0℃~+55℃
Recommended Operating Temperature	Discharge：+15℃~+30℃
	Charge：+15℃~+30℃
	Storage: 0℃~+35℃
Altitude	<2000m
Humidity	15%~95%
Cooling method	Natural heat dissipation
Protection Degree	IP20
Dimension (mm) (L*W*H)	482.6*450*133.4
Weight (kg)	40
Standards	IEC62619 / CE / UN38.3

High Voltage Lithium Battery System

Energy Cube LH75

576V~720V **43.2kWh~216kWh**

TBB LH75 Energy Cube is a high voltage battery storage system based on lithium iron phosphate battery. Multiple LH75 lithium batteries are connected in series to form an EnergyCube for larger capacity, to meet longer power supporting duration demand. LH 75 Energy Cube is especially suitable for application scenario with limited installation spaces but requiring high power, long power backup time and long service life.

Its positive electrode materials are lithium iron phosphate. Battery cells are managed effectively by BMS with better performance, which can manage and monitor cells information including voltage, current and temperature.

- Comply with European ROHS, Certified SGS, employ non-toxic, non-pollution environment-friendly battery.
- Anode materials are lithium iron phosphate (LiFePO4), safer with longer life span.
- Carries battery management system with better performance, possesses protection function like over-discharge, over-charge, over-current, abnormal temperature.
- Self-management on charging and discharging, single core balancing function.
- Intelligent design, integrated inspection module.
- Flexible configurations allow parallel and series connection of multi battery for longer standby time.
- Self-ventilation with lower system noise.
- Less battery self-discharge, and its recharging period can be up to 10 months during the storage.
- No memory effect so that battery can be charged and discharged shallowly.
- With wide range of temperature for working environment, -20℃ ~ +55 ℃, and the circulation span and discharging performance are well under high temperature.
- Less volume, lighter weight.

Model NO.	LH75
Cell Technology	Li-ion(LFP)
Battery Module Capacity	3.6kWh / 75Ah
Battery Module Voltage (Vdc)	48
Battery Module Charge Voltage (Vdc)	54
Battery Module Charge Current (Normal)	37.5
Battery Module Discharge lower-Voltage (Vdc)	42
Battery Module Discharge Current (Normal)	37.5
Dimension(W*D*H, mm)	481*410*133
Communication	CAN
Pollution Degree (PD) / IP Grade	I / IP20
Weight(kg)	31.5
Standards	CE / UN38.3

Item	EnergyCube LH75-43.2	EnergyCube LH75-46.8	EnergyCube LH75-50.4	EnergyCube LH75-54.0
Nominal Voltage (V)	576	624	672	720
Work Voltage Range (V)	504~648	546~702	588~756	630~810
Battery Module Name	LH75	LH75	LH75	LH75
Module configuration	12 Series	13 Series	14 Series	15 Series
Nominal Energy (kWh)	43.2	46.8	50.4	54.0
Nominal Power (kW)	25.92	28.08	30.24	32.40
Max Power (kW)	43.2	46.8	50.4	54.0
Charging Current (A)	37.5	37.5	37.5	37.5
Discharge Current (A)	37.5	37.5	37.5	37.5
Dimension (mm)	601*510*1393*2	601*510*1393*2	601*510*1393*2	601*510*1393*2
Weight (kg)	507	538.5	570	601.5

Item	EnergyCube LH75-86.4	EnergyCube LH75-93.6	EnergyCube LH75-100.8	EnergyCube LH75-108.0
Nominal Voltage (V)	576	624	672	720
Work Voltage Range (V)	504~648	546~702	588~756	630~810
Battery Module Name	LH75	LH75	LH75	LH75
Module configuration	12 Series 2 parallel	13 Series 2 parallel	14 Series 2 parallel	15 Series 2 parallel
Nominal Energy (kWh)	86.4	93.6	100.8	108.0
Nominal Power (kW)	51.84	56.16	60.48	64.80
Max Power (kW)	86.4	93.6	100.8	108.0
Charging Current (A)	75	75	75	75
Discharge Current (A)	75	75	75	75
Dimension (mm)	601*510*1393*4	601*510*1393*4	601*510*1393*4	601*510*1393*4
Weight (kg)	1014	1077	1140	1203

Item	EnergyCube LH75-129.6	EnergyCube LH75-140.4	EnergyCube LH75-151.2	EnergyCube LH75-162.0
Nominal Voltage (V)	576	624	672	720
Work Voltage Range (V)	504~648	546~702	588~756	630~810
Battery Module Name	LH75	LH75	LH75	LH75
Module configuration	12 Series 3 parallel	13 Series 3 parallel	14 Series 3 parallel	15 Series 3 parallel
Nominal Energy (kWh)	129.6	140.4	151.2	162.0
Nominal Power (kW)	77.76	84.24	90.72	97.20
Max Power (kW)	129.6	140.4	151.2	162.0
Charging Current (A)	112.5	112.5	112.5	112.5
Discharge Current (A)	112.5	112.5	112.5	112.5
Dimension (mm)	601*510*1393*6	601*510*1393*6	601*510*1393*6	601*510*1393*6
Weight (kg)	1521	1616	1710	1805

Item	EnergyCube LH75-172.8	EnergyCube LH75-187.2	EnergyCube LH75-201.6	EnergyCube LH75-216.0
Nominal Voltage (V)	576	624	672	720
Work Voltage Range (V)	504~648	546~702	588~756	630~810
Battery Module Name	LH75	LH75	LH75	LH75
Module configuration	12 Series 4 parallel	13 Series 4 parallel	14 Series 4 parallel	15 Series 4 parallel
Nominal Energy (kWh)	172.8	187.2	201.6	216.0
Nominal Power (kW)	103.68	112.32	120.96	129.60
Max Power (kW)	172.8	187.2	201.6	216.0
Charging Current (A)	150	150	150	150
Discharge Current (A)	150	150	150	150
Dimension (mm)	601*510*1393*8	601*510*1393*8	601*510*1393*8	601*510*1393*8
Weight (kg)	2028	2154	2280	2406

Battery

T B B R E N E W A B L E

ACCESSORIES

Simple Mounting Bracket

- 3U for ES100 II, 522*172*398mm
- Support up to 4 pcs lithium batteries

Power Rack
Lithium Battery Rack Cabinet

- IP65
- For installation of 4xES100 II

PDP-ES

- 1*300A DC switch
- Rack-mounted
- IP20
- Work with ES100 II, a set of power cable needs to be equipped with a PDP

Super-C Series

Lead Carbon Battery

12V 100Ah, 170Ah

2V 500Ah, 1000Ah

Technical Features

- Best performance for continuous operation up to 35℃
- Extend service life under deep cycle
- Excellent over discharge recovery capability

Benefits

- Superior PSoC and deep cycling performance
- Excellent quick charge performance, reduce charging time by 30%
- Excellent over discharge recovery capability

Main Applications

- Renewable energy (wind & solar) site
- Off grid & bad-grid environment
- Communication and signal systems
- UPS and emergency illumination
- IDC

Model No	C-100-12	C-170-12	C-500-2	C-1000-2
Nominal Voltage (V)	12		2	
Capacity (C10)	100Ah @25℃	170Ah @25℃	500Ah @25℃	1000Ah @25℃
Internal Resistance (mΩ)	7	5.2	0.30	0.24
Short-circuit current (A)	1659	1804	7300	9100
Operation Temperature Range	Discharge: -40℃~65 ℃		Discharge: -40℃~50℃	
	Charge: -20℃~45 ℃		Charge: -20℃~45℃	
	Storage: -20℃~40 ℃		Storage: -20℃~40℃	
Recommended Operating Temperature	15℃~30℃			
Maximum Charging Current (A)	30	51	150	300
Charging Voltage @35℃	Float: 2.23V/cell			
	Equalize: 2.35V/cell			
Terminal	M6		M8	
Outcase	ABS			
Capacity affected by Temperature (C10)	105% @40℃			
	85% @0℃			
	60% @-20℃			
Design Life @ 30℃	15 years		20 years	
Cycles	1500 cycles @60% DOD		2500cycles @60% DOD	
Weight (kg)	35.5	58	34.3	69
Dimension (mm)	400x110x286	552x125x310	183x207x358	357x211x358

Battery monitor and equalizer

Battery Guard Kit

Battery Guard Devices

For the new battery bank of 24Vdc or 48Vdc which is composed by several batteries, minor difference of internal leakage current will cause undercharge or overcharge of parallel or series connected batteries. The frequent encountered Partial Stage of Charge (PSoC) makes this situation even worse, as the result of rare opportunity to fully charge the battery.

Battery Guard equalizes each battery individually and, in the meantime, monitors the real time voltage and temperature of each battery unit. The SoC difference will be ironed out during charging.

Taking an example of 48Vdc battery bank composed of 4 units of 12V battery in series connection, when voltage of one unit is higher than the others and meantime the average voltage of each unit is higher than 13V, the BGK module connected to this unit will be triggered. The BGK will draw a current of up to 200mA from the battery (or parallel connected batteries) with the higher voltage. This will help all batteries in series/parallel connection to have the same stage of charge.

Working with TBB inverter or system monitor, BGK can improve battery life span, with alarm for over voltage and under voltage of individual battery. It will send real time data to TBB inverter or central monitor. There is a LCD display on each module as well showing voltage and temperature.

Model No.	BGK-12	BGK-02
Voltage range (V)	11.5~17	1.9~3
Maximum equalization current (mA)	200	1000
Alarm trigger high level (mV)	250	50
Alarm trigger low level (mV)	100	20
Maximum module number (pcs)	4	24
Over voltage alarm	Yes	
Over temperature alarm	Yes	

Others

Display	Digital tube+LED
Communication port	RS485
Dimension (mm)	85*85*35
Operating temperature	-25°C ~ +60C
Humidity (non condensing)	95%
Weigh (kg)	0.2
Protection category	IP22
Cooling	Natural Cooling

Standards

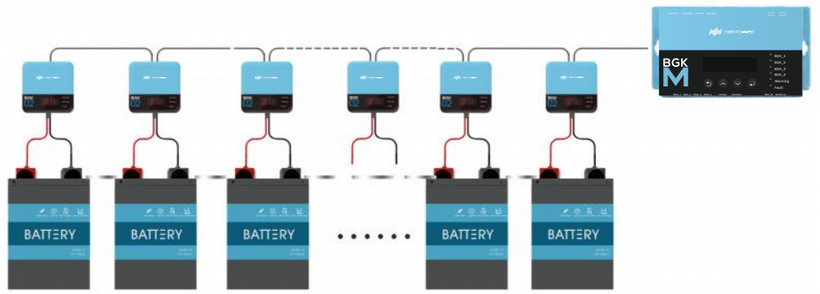
Safety regulation	EN60950
Emission, Immunity	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN55014-1, EN55014-2

Master monitor for BGK when grouped

Battery Management

Battery Guard Master

Battery Guard Master is a new generation monitoring manager, which integrates four slave communication channels for connecting the Battery Guard Kits and one external communication channel. It can simultaneously monitor multiple groups of equipment, featuring convenient system expansion and operation. It has the characteristics of small size, strong carrying capacity and high intelligence, which could be widely used in a variety of battery systems.



Model No.	BGK-Master-M	BGK-Master-S
Battery voltage range	23~35	46~70
Display	LCD+LED	

General data

Programmable relay	2x
Protection	Low battery voltage
Communication	RS485
Operating temperature range	-20 ~ +65°C
Storage temperature range	-40 ~ +70°C
Relative humidity in operation	95% without condensation

Mechanical Data

Dimension (mm)	192*108*45
Net Weight (kg)	0.7
Cooling	Natural cooling
Protection index	IP22

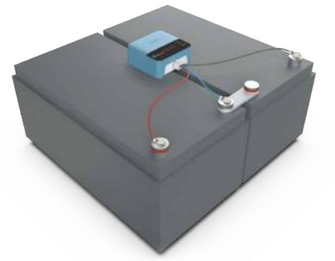
Standards

Safety	EN60950
Emission, Immunity	EN61000-6-3, EN55014-1, EN61000-6-2, EN55014-2

Voltage Balancer between two batteries

Battery Management

Battery Guard Balancer



Battery Guard Balancer is equipped with the same function as Battery Guard Kit. Battery Guard Balancer is an economical version for 24Vdc battery system.

Battery Guard Balancer will automatically trigger balancing when midpoint deviation voltage of two batteries is greater than 200mV and both of battery voltage is greater than 13.2V. It will stop balancing when both of battery voltage is less than 13V or deviation voltage is less than 50mV.

- One unit for two 12V batteries connected
- Voltage and temperature display
- Over voltage and under voltage alarm
- Over temperature alarm
- Can be paralleled for multiple strings of 24V battery system

Model No.	24V-Balancer
Voltage range (V)	23~34
Maximum equalization current (mA)	200
Alarm trigger high level (mV)	250
Alarm trigger low level (mV)	100
Over voltage alarm	Yes
Over temperature alarm	Yes

Others

Display	Digital tube+LED
Communication	RS485
Dimension (mm)	85*85*35
Operating temperature	-25°C ~ +60°C
Humidity (non condensing)	95%
Weigh (kg)	0.2
Protection category	IP22
Cooling	Natural Cooling

Standards

Safety regulation	EN60950
Emission, Immunity	EN61000-6-3, EN55014-1, EN61000-6-1, EN61000-6-2, EN55014-2

Automatic Voltage Switch

Automatic Voltage Switch

AVS **30A / 50A**

The utility grid is a big and complex power network and has millions kinds of devices running on it. But the utility is not always stable and reliable, and there are many electric appliances suffered from surge and spike of the grid utility sometimes. It's considerable to protect your appliances when surge and spike occurred.

Many countries or regions are suffering from unstable grid. Voltage variation is the main reason causing the electrical appliances' failure. With a simple device, you can protect your appliances against the damage of unstable grid.

TBB AVS is an Automatic Voltage Switcher built-in with micro-processor. The AVS will switch off the equipment connected to it if the grid voltage goes beyond threshold limits and will re-connect automatically when the mains power returns to normal. Re-connection takes place after a time delay to ensure the stability of the mains. In addition, the start-up delay provides protection against power-back surges which are commonly experienced after the recovery of power. The surge and spike protection are also incorporated to ensure the protection against these commonly occurring events.

- Built-in micro-processor control
- Over-voltage and under-voltage protection with built-in time delay
- Switch-off voltage threshold and the delay time are all adjustable
- LCD displays protection voltage level
- Support manual switch on/off when needed

Model No.		AVS30	AVS50
Nominal Voltage (VAC)		230	
Power (W)		6900	11500
Frequency (Hz)		45 ~ 55 / 55 ~ 65	
Nominal Current (A)		30	50
Max consumption (W)		<10	
Wait time (s)		0 ~ 600 (Adjustable)	
High Voltage Disconnect (VAC)		230 ~ 300 (Adjustable)	
High Voltage Reconnect (VAC)		"High Voltage Disconnect" -10	
Low Voltage Disconnect (VAC)		150~230 (Adjustable)	
Low Voltage Reconnect (VAC)		"Low Voltage Disconnect" + 5	
Max voltage (VAC)		300	
Surge and spike protection	Joules	220J	
	Amps	6500A (8 / 20us)	
Protection index		IP41	
Operating temperature range		-20 ~ +45℃	
Net Weight (kg)		0.40	0.43
Dimension (mm)		190*130*55	
Standard		IEC-60669-1:2000	

Power Distribution

DC Distribution BOX

BSB 175A/250A

- BSB 175A is for 48V/5kW inverter
- BSB 250A is for 48V/8kW inverter
- Support parallel connection with the same distribution box

DC BOX-3T

- Suitable for DC Coupled PV system using three 48V/8kW inverters in parallel
- Support parallel connection with the same distribution box

BSB3-1 175A/250A

- BSB3-1 175A is for DC Coupled PV system using a 48V/5kW inverter
- BSB3-1 250A is for DC Coupled PV system using a 48V/8kW inverter
- Support parallel connection with the same distribution box

DC BOX-6T

- Suitable for DC Coupled PV system using three 48V/8kW inverters in parallel
- 6 x 250A/2P DC breakers

Model No.	BSB, 175A	BSB, 250A	BSB3-1, 1750A	BSB3-1, 250A	DC BOX-3T	DC BOX-6T
Rated voltage	48VDC	48VDC	48VDC	48VDC	48VDC	48VDC
Fuse	1x175A, 80Vdc	1x250A, 80Vdc	1x175A, 80Vdc 3x125A, 80Vdc	1x250A, 80Vdc 3x125A, 80Vdc	4x400A, 80Vdc 3x200A, 80Vdc 3x125A, 80Vdc	/
Switch	1x300A, 50Vdc	1x300A, 50Vdc	1x300A, 50Vdc	1x300A, 50Vdc	3x300A, 50Vdc	/
Breaker	/	/	/	/	/	6x250A/2P, 500Vdc
Wiring terminal	M8 screw	M8 screw	M8 screw	M8 screw	M8 screw	M8 screw
Temperature, altitude	-25℃~+60℃, 2000m (>2000m derating)					
General data	Galvanized sheet, spray painted surface RAL9003, IP20, Wall-mouted					
Dimensions/ weight	176*190*105.5mm, 1.7kg	176*190*105.5mm, 1.7kg	270*190*94.5mm, 2.4kg	270*190*94.5mm, 2.4kg	1000*600*200mm, 47kg	580*450*162.5mm, 23.6kg

AC Distribution BOX

BLOCK 3T
AC Distribution BOX

- 465*450*115mm
- 13kg
- Wall-mounted
- IP20
- Suitable for 3-phase and parallel systems composed of 3 units TBB inverters (5kw-8kw each) and 2 units PV inverters (15kW each)

BLOCK 6T
AC Distribution BOX

- 580*600*115mm
- 22kg
- Wall-mounted
- IP20
- Suitable for 3-phase and parallel systems composed of 6 units TBB inverters (5kw-8kw each) and 3 units PV inverters (15kW each)

BLOCK 9T
AC Distribution BOX

- 700*1000*200mm
- Wall-mounted
- IP20
- Suitable for 3-phase and parallel systems composed of 9 units TBB inverters (5kW-8kW each) and 3 units PV inverters (30kW each)

Model No.	BLOCK-3T	BLOCK-6T	BLOCK-9T
Rated voltage / Frequency	400/230VAC (50/60 Hz)		
Rated current	63A	125A	250A
Inverter input circuit breaker	1x C Type, 3P, 63A	2x C Type, 3P, 63A	3x C Type, 3P, 63A
Inverter output circuit breaker	1x C Type, 3P, 63A	2x C Type, 3P, 63A	3x C Type, 3P, 63A
PV inverter output circuit breaker	1x C Type, 3P, 32A	3x C Type, 3P, 63A	3x C Type, 3P, 63A
Maintain Bypass Switch	C Type, 4P, 63A	C Type, 4P, 125A	C Type, 4P, 160A
System output circuit breaker	C Type, 3P, 63A	C Type, 3P, 125A	C Type, 3P, 160A
Ac input terminal	63A, 9~3AWG, M5 screw	125A, 18~2AWG, M6 screw	232A,18~2AWG, M8 screw
Wiring terminals for inverter input and output, PV inverter output	63A, 9~3AWG, M5 screw		
System output wiring terminal	125A / 800V, 18~2AWG, M6 screw		232A/1000V,18~2AWG, M8 screw
Ground copper bar	2*35*160mm, 12 holes (M5)	2*35*260mm, 22 holes (M5)	3*20*300mm, 25 holes (M6)
Temperature, altitude	-25°C ~ +60°C, 2000m (>2000m derating)		
General data	Galvanized sheet, spray painted surface RAL9003, P20, Wall-mouted		
Dimensions / weight	465*450*115mm, 13kg	580*600*115mm, 22kg	700*1000*200mm

PV COMBINER BOX

PV BOX

PVB series PV combiner box is designed for solar off-grid system available with series of max VOC 150Vdc and 250Vdc. It can be used between PV array and solar charge controller or a solar inverter. With built in MC4 connector, fuse, circuit breaker and SPD, it can facilitate the installation as well as improve the system safety.

- Built-in fuses for each string of PV against short circuit
- Built-in Surge Protection Device will effectively protect the connected charger or solar inverter
- Built-in main DC MCB for easy maintenance
- Adopting MC4 connectors provides simple and easy connection
- Supplied with additional MC4 connectors used on PV array
- IP54, wall-mounted design

Model NO.	PVB150-8	PVB150-6	PVB250-5	PVB150-4	PVB250-3	PVB3-1-SPD	PVB4-1-SPD
Applicable MPPT Charger	SP150-120	SP150-80	SP250-100	SP150-60	SP250-70	150V 60A (Built-in RiiO Sun/ Apollo Maxx)	150V 90A (Built-in RiiO Sun/ Apollo Maxx)
Open circuit voltage	150VDC		250VDC	150VDC	250VDC	150VDC	
Number of string	8	6	5	4	3		4
Fuse per string	15A						
DC circuit breaker	100A			63A		/	
SPD	Un: 220VDC		Un: 280VDC	Un: 220VDC	Un: 280VDC	Un: 220VDC	
	In:20KA						
	Imax: 40KA						
	Up<1.2KV		Up: ≤1.4 KV	Up<1.2KV	Up: ≤1.4 KV	Up<1.2KV	
Operating temperature	-25 ～ 60℃						
Storage temperature	-40~70℃						
Cooling	Natural cooling						
Humidity	95%（25℃）, non-condensing						
Altitude	3000m (full rated output up to 2000m)						
Protection category	IP54					IP20	
Dimension (LxWxH)	550mm×400mm×135mm			400mm×250mm×97mm		255mm*198mm*110mm	
Net Weight	12.4kg	12.0kg	11.8kg	5.1kg	4.9kg	1kg	1.2kg

Case Studies

With more than 16 years of experience in the solar industry, TBB Renewable has provided high quality products and solutions to more than 50 countries around the world at competitive price along with comprehensive service. Till 2022, we have more than **450,000** systems installed world wide. Here are some typical installations.

48kW mini-grid project in Nigeria

Background:

TBB Renewable provides independent power to a remote village in Ondo State, where local villagers were forced to live with zero electricity supply for generations.

TBB Solution:

Off-grid AC+DC Coupled PV system

- 6 x 8kW Kinergier Pro inverter chargers
- 2 x 15kW PV inverters for AC Coupled configuration
- 3 x Solar Mate 250V/100A MPPT solar charge controllers for DC Coupled configuration
- 40 x 48V/2.4kWh TBB LS50 Lithium Batteries
- 7 x IP65 Power Rack cabinets for mounting the lithium batteries
- 50kW PV panels
- 1 x Kinergy Wireless Data Logger to transmit real-time system data to the NOVA APP & Web for remote monitoring

System Benefits:

- This 48kW mini-grid system provides independent and reliable energy 24 hours a day, basically meeting the electricity demand of local 500 households and bringing them bright, hope and better living conditions.

A More Sustainable & Economical Business Model Facilitated by TBB Renewable

Background:

At a beautiful surf resort in the Telos islands in Sumatra, Indonesia, where grid supply is beyond reach, a complete TBB offgrid storage system has been successfully deployed.

TBB Solution:

Off-grid DC Coupled PV System

- 3 pcs 6kW Kinergier Pro Inverter Chargers connected in three phase - 18kW
- 8 pcs TBB LS75 Lithium Batteries (48V/3.6kWh) - 28.8kWh
- 3 pcs TBB Solar Charger Controllers (150V/80A)
- 12kW Solar Panels

System benefits:

- Maximizes the use of solar energy to provide a stable and economical power supply, facilitating 24-hour green electricity flow for the guests while significantly cutting down the energy bills for the resort owner
- Eco-friendly to protect the pristine environment on the island

A household in Spain massively reduces their energy costs

Background:

A household in Spain installed a TBB offgrid system to live almost independently from the public grid and massively reduce their energy costs.

TBB Solution:

Off Grid DC Coupled PV System

- 6 x 5kW Apollo Maxx All-in-one Solar inverters
- 6 x 48V/3.6kWh TBB LS75 Lithium Batteries
- Solar Panels - 9.5kW
- 1 x Kinergy Wireless Data Logger for communication with TBB NOVA Web & APP for remote system monitoring

System Benefits:

- Electricity for the household supplied from their own offgrid system
- Storage of self-generated electricity with lithium batteries
- Total independence within reach: 40kWh on sunny days

A Family in South Africa Got Private Power

Background:

In South Africa, an increasing number of people are eager to escape the reliance on their crumbling Eskom and turn to self-sufficient power systems. Loads of this family: 6 geysers on timers + 2 heat pumps+Swimming pool

TBB Solution:

Off-grid AC Coupled PV system

- 18kW TBB Kinergier Pro Inverter Chargers
- 15kW PV Inverter
- 19.8kW solar panels
- 12pcs 75Ah LS75 lithium batteries (900Ah in total)

Benefits:

- Provide higher efficiency PV power to power the load directly in the daytime. When the PV generation surpasses the load consumption, the PV inverter will charge the batteries in reverse via Kinergier Pro;
- When the battery is fully charged, Kinergier Pro will regulate the PV Inverter's output frequency to prevent the battery from overcharging.

A Bank Secures Normal Operation with TBB Off-grid Solution

Background:

As an economically backward but rising country, Nigeria's power development degree is relatively low. The power grid is unstable and prone to failures, resulting in frequent power outages in many regions.

TBB Solution:

Off-grid AC+DC Coupled PV system

- 6 pcs 8kW Kinergier Pro inverter chargers connected in parallel three phase
- 8kW Kinergier Pro inverter charger to provide power for critical loads
- 2 pcs15kW PV inverters
- 2 pcs MPPT solar charge controllers (250V/100A)
- 84 pcs 540W PV panels (45.36kW)
- Kinergy Wi-Fi for remote system monitoring via TBB NOVA Online Portal

System Benefits:

- The load consumption can be fully covered by the PV energy.
- Any excessive solar energy will be stored in the batteries for mission-critical loads.
- When the battery voltage drops to the preset low value, the generator will be automatically started to continue the power supply and to charge the batteries as well.
- The bank's normal operation is perfectly secured with 24 hours energy flowing, greatly cutting the fuel expenses.

A TBB Off-grid System Built up to Cater to the Needs of a Household

Background:

In South Africa, the power supply and demand are awfully unbalanced, which makes people eager to find a suitable independent power solution. In Cape Town, a set of 16 KW TBB off-grid system was neatly built up for a residential project to cater to their needs of large consumption (100kWh per day).

TBB Solution:

Off Grid DC Coupled PV System

- 2 pcs 8kW TBB Kinergier Pro Inverter Chargers
- 1 pcs 250V 100A TBB Solar Charge Controller
- 6.6 kW Solar Panels
- 8 pcs 50Ah/48V TBB LS50 Lithium Batteries

Benefits:

- In the daytime, PV directly charges the battery via solar charge controller at higher efficiency. When the solar power is higher the power required by the batteries, Kinergier Pro will assist the grid in powering the loads. If the grid fails suddenly, Kinergier Pro would draw the power from batteries to support the loads.
- No blackout any more!

A family in Germany cuts down energy bills with TBB

Background:

Electricity price in Germany reaches unprecedented high levels.

TBB Solution:

Off Grid DC Coupled PV System

- 2 x 5kW Apollo Maxx All-in-one Solar Inverters
- 6 x 48V/5.04kWh ES100 Lithium Batteries
- 9.12kW Solar Panels
- 1 x Kinergy Wireless Data Logger to transmit real-time system data to NOVA APP & Web for remote monitoring

System Benefits:

- Use solar first to power appliances in the day, massively reducing grid consumption
- High-density battery storage to easily power loads all night
- 0-2ms UPS transfer time to ensure an interrupted backup power in case of a grid failure
- 300% surge capability to ensure a safe system operation

TBB DC coupled PV system for a family in Zimbabwe

Background:

This household in Zimbabwe was faced with constant utility downtime.

TBB Solution:

Off Grid DC Coupled PV System

- 3 x 5kW Apollo Maxx All-in-one Solar Inverters
- 6 x 465W Solar Panels
- 3 x 48V/200Ah Lithium Batteries
- 1 x Kinergy Wireless Data Logger for remote system monitoring via TBB NOVA Online Portal

System Benefits:

- UPS-level switch function (< 2ms) to provide an uninterrupted power supply
- Solar PV self-consumption increased and electricity bills cut down
- Easy monitoring for high-efficient problem-solving and lower on-site labor costs

TBB brings power to a surf club in Liberia

Background:

A TBB pure off-grid system has been installed to bring power to a surf club in Robertsport, Liberia.

TBB Solution:

Off Grid DC Coupled PV System

- 3 x 5kW Apollo Maxx All-in-one Solar Inverters
- 2 x TBB 250V/100A Solar Mate MPPT Solar Charge Controllers
- 31.8kWh Lithium Batteries
- 8kWp PV Panels

System Benefits:

- During the day, the system is able to cover a large proportion of energy requirements
- Surplus energy is stored temporarily and can be used at night
- Apollo Maxx's strong overload capability enables uninterrupted operation

No more brownouts for a Philippine family

Background:

A local family in the Philippines frequently experienced brownouts.

TBB Solution:

Off Grid DC Coupled PV System

- 2 x 5kW Apollo Maxx All-in-one Solar inverters
- 27 x 400W PV Panels
- 1 x 51.2V/200Ah Lithium Battery
- 1 x Kinergy Wi-Fi communication device to connect the system to the NOVA APP & Web for remote monitoring

System Benefits:

- Typical 0~2ms transfer time: uninterrupted power supply guaranteed
- Transformer-based design: powering all kinds of heavy loads easily
- Parallel and three phase operation: easy to expand system

Distributed Energy Storage

Installations All Over the World

Committed to providing global users with cost-effective, reliable, efficient and sustainable energy solutions

Case Studies

Nigeria AC+DC Coupled PV Mini-grid System in a Local Village

Thailand 6kW DC Coupled PV System for a House

South Africa 18kW AC Coupled PV System with Kinergier Pro

Mauritania 48kW AC+DC Coupled PV System in Nouakchott

Ivory Coast 15kW DC Coupled PV System

Australia 24kW DC Coupled PV System in Tasmania

Zimbabwe 15kW Off-grid System for a Home

Philippines 48kW DC Coupled PV System for a Municipal Building

Germany 10kW DC Coupled PV System for a Local Household

Bolivia 15kW Off-grid System for a Rural Small Farm

Indonesia 3kVA Off-grid System for Farm irrigation

Mali 15kW Offgrid System with Apollo Maxx

Lebanon 16kW Offgrid System for a Family

Zambia Kinergier Pro in a 24kW DC Coupled Offgrid System

Malawi 8kW DC Coupled PV System for a Family

Spain 30kW DC Coupled PV System

Kenya 8kW AC+DC Coupled PV System with Kinergier Pro

Uganda 5kW AC+DC Coupled PV System for an Office

Comprehensive Services

Professional Online & Offline Training

Warranty Service

24/7 Technical Support

Promotional Materials Support

About TBB Renewable

Found in 2007 with location in Xiamen city, TBB Renewable is specialized in providing off-grid, mini-grid and ESS solutions. With 16 years experience, TBB Renewable has become a global solution provider in the renewable market serving clients across more than 50 countries, committed to providing one-stop power solution, including power generation, power conversion, storage, system monitoring & cloud, system accessories. Integrated all-in-one system is also available for easier and quicker installation.

Increasing Installations and Comprehensive Service

Till now, more than 450,000 sets of TBB off grid system are operating stably all over the world, including commercial and residential applications. TBB Renewable also provides comprehensive service to its customers in order to achieve optimal satisfaction.

Innovative Supplier in Inverter Industry, Quality First

As a national recognized high-tech enterprise, TBB Renewable designs and manufactures its products at its own industrial park, supported by a strong R&D team with 100+ staffs. Combing the multiple modern technologies, TBB Renewable aims to supply innovative and green digital controlled system for various applications. TBB Renewable has obtained ISO9001 quality management system and more than 100 patents and copyrights, to ensure that performance and quality go hand-in-hand across the entire range.

International Green Energy Advocate

In collaboration with our partners and customers, we are helping people turn to a self-sufficient, decentralized and renewable energy supply.