格睿德
GRIDELEC


# 产品手册
# PRODUCT MANUAL

深圳市格睿德电气有限公司
Shenzhen Grid Power Co.,LTD.

# COMPANY PROFILE

GRIDELEC, established in July 2019, is a high-tech enterprises focusing on Intelligent micro-grid PCS (on-grid PCS and off-grid PCS), V2G isolated bidirectional module, modular PCS and total solution, Charge and discharge power with feedback (including battery and DC power Burn-in test equipment), High-power PCS & total solution (1000V 500kW / 630kW, 1500V 1.25MW) and energy storage system R & D, sales and manufacturing.

GRIDELEC has its own intellectual property of high-frequency isolated bidirectional conversion, High-power PCS, seamless switching between on-grid and off-grid, multiple parallel operation in island mode and other technologies, reaching leading level of this industry. V2G (IBG20kW / 15kW / 5kW) series modules independently R&D by the company adopt full high frequency isolation design, DSP + CPLD full digital control, and  key technical indicators are at the leading level in this industry. They are suitable for multi-purpose scenarios such as vehicle network interactive V2G, modular energy storage system, battery formation and capacity division, DC power aging, etc.; the bidirectional high frequency isolated DCDC (IBDC20kW / 15kW / 10kW / 5kW) independently R&D by the company Series modules can be applied to the application scenarios of common DC bus, such as photovoltaics storage charge and inspection Integration, storage and charge Integration, etc.; the on-grid and off-grid PCS constructed by "high frequency isolation + on-grid and off-grid switching" is NO.1 in the industry, It has the advantages of small size and light weight and has been successfully applied to 5G Base station energy storage system; The 1000A/2500A energy storage system constructed with high frequency isolated low voltage high current IBG30050 (40~300Vdc 100A) module PCS has been successfully applied to Vanadium Redox Battery energy storage system and put into operation.

GRIDELEC has a young and energetic R&D team. The heads of all fields of the team have obtained a master's degree or above, have a Fortune 500 working background, have more than 10 years of experience in power electronic product development, and have successful product development experience. The company has 8 patents, and another 10 (3 utility model patents, 3 invention patents, and 4 software copyrights) have been examined and substantively examined, and all products sold have passed relevant certifications.

GRIDELEC will uphold the core values of "integrity, focus, innovation, and win-win" from the beginning to the end, with the mission of "customer achievement, service with heart" as the enterprise development mission, technological innovation as the driving force, and customer achievement as its mission. GRIDELEC will continue to focus on the accumulation of technology and the improvement of management experience, and is committed to becoming a respected excellent supplier of energy Internet product and solution.

# Contents





## V2G isolated bidirectional module(20kW/15kW)

V2G, Vehicle to Grid, the core idea is to realize bi-direction interaction between electric vehicles and power Grid, the energy storage of electric vehicles is used as a supplement to power Grid and renewable energy. The energy storage of electric vehicles can be used as peak cutting and valley filling,and earn the price difference,wave trough charge,wave crest on-grid discharge.V2L,Vehicle to Load, electric Vehicle with bi-direction charge-discharge machine,can be used as a mobile power station to supply power for 220V or 380V AC Load, which is equivalent to a large mobile charger.

The AC/DC part adopts three-level technology to realize bi-direction conversion between AC and DC; DC/DC part adopts high frequency isolated DC bidirectional transformation technology, namely soft switch resonance technology, high efficiency, and converter power bidirectional flow, charging and discharging automatic conversion; Double DSP is adopted to ensure the stability of AC/DC and DC/DC bidirectional performance, support the function of parallel modules, support CAN communication, and facilitate communication and control with the third party equipment.The module is widely used in energy storage system, battery formation and capacity grading, emergency power supply and DC power aging and other fields, which is the preferred product in the power bi-direction flow application industry.

# Highlight

## More safe and reliable

Full high frequency isolation design to ensure safety between battery and grid/load;
DSP+CPLD digital control, multi – level software and hardware overcurrent, overvoltage, overtemperature protection, safe and reliable;
Double DSP design, stable and reliable performance;
Reliable parallel function, convenient power expansion, up to 12 modules parallel;
Strong power grid adaptability.

## Higher efficiency

Compared with the traditional bidirectional module, the power frequency transformer is reduced, and the efficiency of high frequency isolation is higher, up to more than 95%;
AC/DC adopts three-level technology with the highest efficiency up to 98%.;
The DC/DC adopts soft switch resonance technology with the highest efficiency up to 97%.

## More intelligent and friendly

Cooperate with STS module to switch seamlessly from on-grid to off-grid ;
Covering multiple battery voltage classes of passenger vehicles (100V~750Vdc), with wide battery voltage range;
Wide grid voltage range and 50/60Hz voltage frequency adaptive capacity.

## Lower cost

Compared with the traditional bidirectional module, high-frequency isolation eliminates the power frequency isolation transformer and the system cost is low;.
Through a circuit, the two functions of charging and inverter, charging and discharging are integrated in one, and cost is low.

## More flexible configuration

Support 19 inches standard rack mount, compact structure;
Module hot plugging design, flexible system configuration;
It is convenient for system integrator to design different forms of energy storage system or battery forming system flexibly.

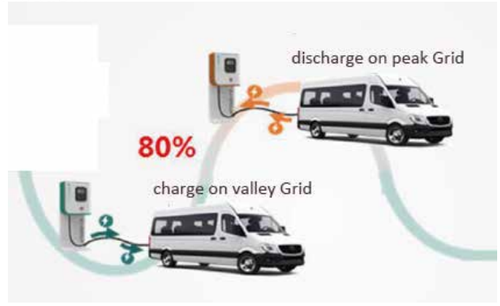


# Application

## V2G (Electric vehicle energy storage)

With the increase number of electric vehicle, according to forecast electric vehicles will reach 80 million units in 2030, huge amounts of electric vehicles can be used as flexible user side storage, help adjust electric power load, peak cutting and valley filling and absorb renewable energy, and provide auxiliary services such as frequency modulation and standby for power grid, reduce investment in power grid distribution network.

The electric vehicle energy storage V2G is a bidirectional DC charging pile, which can be charged and discharged. The maximum power can reach 250kW, covering the current power demand of most DC charging piles, and realizing the bidirectional flow of energy between the electric vehicle and the power grid;to realize the electric car charging cheap electricity, off-peak electricity, peak time discharge, the owner earn electricity price difference;Improve load flexibility, reduce distribution network investment, absorb clean energy;will boost the development of electric vehicles and reduce the footprint of public grid distribution.



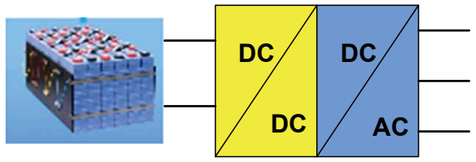

## Energy storage system (retired battery utilization)

The product is a modular PCS, which is very suitable for retired or different power batteries utilization as energy storage system. The power range is 15kW~250kW, It is suitable for energy storage system in industrial and commercial parks.The flexible embedded PCS solution provides core PCS modules, which is convenient for system integrator to design different forms of energy storage system flexibly;

On-grid and off-grid all-in-one machine, which can be switched to off-grid power supply after the power grid is off, suitable for micro-grid (island, remote village, etc.) scenarios;Wide voltage range, very suitable for the vehicle retired power battery echelon application;

Can be configured as mobile energy storage, suitable for G20 summit, Boao Forum, college entrance examination etc.

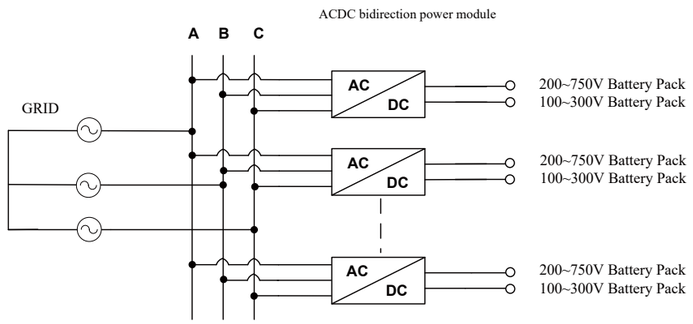
# Application




## Battery forming and capacity division

Up to now, the battery forming and capacity grading has experienced two revolutionary advances.Is based on the energy feedback technology to replace the resistance for the first time, the traditional consumption result in heat energy waste and high temperature, and the production cost is high.The discharge energy feedback technology will transfer renewable electricity back to power grid, save electricity, to achieve the purpose of energy conservation and carbon reduction.The second is high-frequency isolation instead of power-frequency isolation. High-frequency isolation improves system efficiency, reduces system cost, reduces floor space, and further achieves energy saving and efficiency enhancement.

FIG. 2 shows the bidirectional HF isolated power used for battery forming and capacity division. The battery pack group is connected to different module eliminates the power frequency




## DC power aging

DC power , such as EV module, plant power module, telecom module, etc., in the aging process, if there is resistance load or electronic load, there will be huge power loss.If the DC power is connected to the V2G module in the aging process, the electric energy will be fed back to the power grid, which will save at least 95% of the electric energy, save the owner's electricity charge, and save the owner's production cost.



# Technical Specification

| Productname | | V2G bidirectional power module | |
|---|---|---|---|
| Productmodel | | IBG75027 | IBG30050 |
| Charging part | | | |
| AC side parameter | Ratedgrid voltage | 400Vac( 380/400/415Vac canset) | |
| | Grid voltagerange | 304Vac~ 485Vac | |
| | Grid voltage frequency | 50/60±10% (50/60Hzself-adapting) | |
| | Voltage systems | Three-phase four-wire( 3W+PE) | |
| | Input current | ≤38A | ≤29A |
| | powerfactor | ≥0.99,full load | |
| | THD of Current | <3%,full load | |
| Batteryside parameter | Outputvoltage | 200~750VDC,rated 500VDC | 100~ 300VDC,rated 150VDC |
| | Output rated current | 40A | 100A |
| | Ratedpower | 20kW | 15kW |
| | Power derating | 323Vac~485Vac input, full load output | 304Vac~485Vac input, full load output |
| | Chargeefficiency | 95%max (Use SiC devices),94%( Use Si devices) | |
| | Stabilized voltage precision | ± 0.5% | |
| | Stabilizedcurrent precision | ± 1% | |
| | Ripple factor | <1%Vo | |
| Discharging part | | | |
| Battery side parameter | Rated grid voltage | 200~ 750VDC | 100~ 300VDC |
| | Dischargingcurrent | 40A Max | 100A Max |
| AC side parameter | V2G(on-grid discharging) | | |
| | Grid voltage range | 304Vac~ 485Vac | |
| | Grid voltage frequency | 50/60±10% (50/60Hzself-adapting) | |
| | Outputpower | 20kW | 15kW |
| | Efficiency | 95%max ( Use SiC devices) ,94%( Use Si devices) | |
| Other feature | | | |
| Protect function | OV protection | Have | |
| | OC protection | Have | |
| | SC protection | Have | |
| | OT protection | Have | |
| Other parameter | Operating temperature | -30~65℃,55℃ above output power derating | |
| | Storage temperature | -40~75℃ | |
| | Noise | <60dB | |
| | Size (width*height*depth) | 442*575*86mm | |
| | Weight | 20Kg | 19Kg |
| | Level of protection | IP20 (simple module) | |
| | Typeof cooling | Intelligent speed regulation, forced air cooling | |
| Approvalstandards | Performance/Safety/Environment | Meets the standards ofelectric vehicle charging and energy storage system, namely: <<GB/T 34120-2017 technical specification for conversion system of electrochemical energy power storage system>> <<GB/T 34133 -2017 testing code for power converter ofelectrochemical energy storage system >> << NB/T 33001-2018 specification for electric vehicle off-board conductive charger>> <<NB/T 33008-2018Inspection and test specifications for electric vehicle charging equipment >> | |
| | EMC | The Class A technical conditions meet the following standards, namely: <<NB/T 33001-2018 specification for electric vehicle off - board conductive charger >> <<NB/T 33008-2018Inspection and test specifications for electric vehicle charging equipment >> | |


## V2G & V2L isolated bidirectional module(5KW)

V2G, Vehicle to Grid, the core idea is to realize bidirectional interaction between electric vehicles and power Grid, the energy storage of electric vehicles is used as a supplement to power Grid and renewable energy.The energy storage of electric vehicles can be realized by using peak cutting and valley filling,and earn the price difference,wave trough charge,wave crest on-grid discharge.V2L,Vehicle to Load, electric Vehicle with bidirectional charge-discharge machine,can be used as a mobile power station to supply power for 220Vac AC Load, which is equivalent to a large mobile charger.

The AC/DC power supply realizes bidirectional conversion between AC and DC;DC/DC part adopts high frequency isolated DC bidirectional transformation technology, namely soft switch resonance technology, high efficiency, and converter energy bidirectional flow, charging and discharging automatic conversion;Double DSP is adopted to ensure the stability of AC/DC and DC/DC bidirectional performance, support the function of parallel modules, support CAN/RS485 communication, and facilitate communication and control with the third party equipment.

The power supply is widely used in China Tower energy storage system, battery forming and capacity division, emergency power supply and equipment aging and other fields, which is the preferred product in the energy bidirectional flow application industry.



# Highlight

### Safer and more reliable

Full HF isolation design to ensure safety between battery and grid/load;
DSP+CPLD digital control, multi - level software and hardware overcurrent, overvoltage,overtemperature protection, safe and reliable;
Reliable parallel function, convenient power expansion, up to 16 modules parallel;
Strong power grid adaptability.

### Higher efficiency

Compared with the traditional bidirectional power supply scheme, the power frequency transformer is saved, and the HF isolation efficiency is higher, up to over 96%;
The DC/DC adopts soft switch resonance technology, with the highest efficiency up to 98%.

### More intelligent and friendly

It supports two working modes of on-grid and off-grid, namely V2G, V2L and so on;
Covering multiple battery voltage classes of passenger vehicles (10V~100Vdc), with wide battery voltage range;
Wide grid voltage range and 50/60Hz voltage frequency adaptive capacity.

### Lower cost

Compared with the traditional bidirectional module, HF isolation eliminates the power frequency isolation transformer and the system cost is low;
through a circuit, the two functions of charging and inverter, charging and discharging are integrated in one, low cost.

### More flexible configuration

Support 19 inches standard rack mount, compact structure;
Module hot plugging design, flexible system configuration;
It is convenient for system integrator to design different kinds of storage or Battery forming system.

# Application

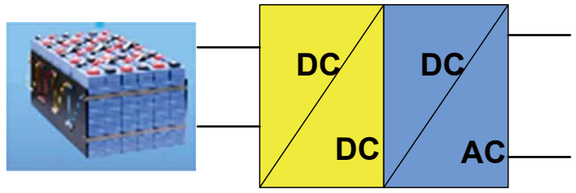
## China Tower low voltage 48V energy storage system

This product is a low-voltage 48V energy storage converter, which is very suitable for retired communication base station or cascade utilization of old lead-acid batteries as energy storage system,the power range is 5kW~80kW, which is suitable for China Tower, household and small and medium-sized industrial and commercial park.The flexible embedded PCS solution provides core PCS modules, which is convenient for system integrators to design different forms of energy storage system flexibly;

Isolated bidirectional AC/DC converter has higher safety, higher efficiency and smaller size after being connected to the battery;

The off-grid and on-grid all-in-one machine can be switched to off-grid power supply after the power grid is off, which is suitable for local load power supply scenario;

Wide voltage range, which is suitable for cascade application of China Tower retired power battery;



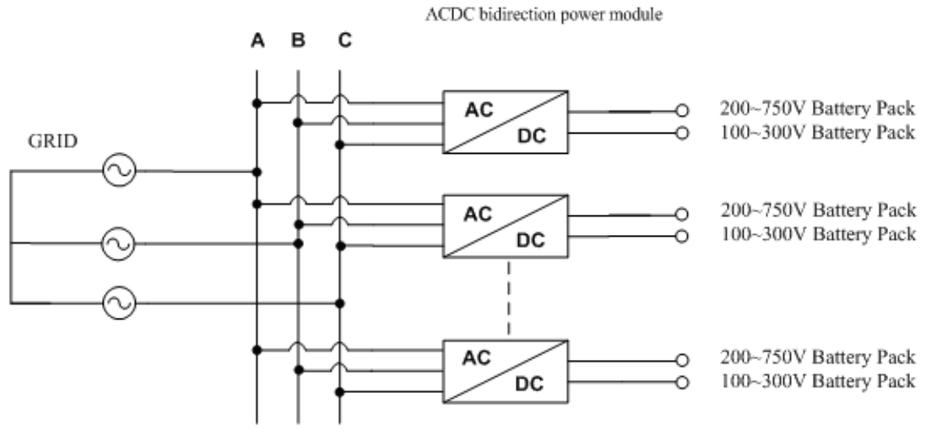

## Battery forming and capacity division

Up to now, the battery forming and capacity division has experienced two revolutionary advances.Is based on the energy feedback technology to replace the resistance for the first time, the traditional consumption result in heat energy waste and high temperature, and the production cost is high.The discharge energy feedback technology will transfer renewable electricity back to power grid, save electricity, to achieve the purpose of energy conservation and carbon reduction.The second is high-frequency isolation instead of power-frequency isolation. High-frequency isolation improves system efficiency, reduces system cost, reduces floor space, and further achieves energy saving and efficiency enhancement.

FIG. 2 shows the bidirectional HF isolated power used for battery forming and capacity division. The battery pack group is connected to different module eliminates the power frequency transformer, making the system more efficient and smaller in size.



Application




## Emergency power supply(EPS)

When the power grid is on, the power grid charges the battery by the energy storage converter;After the power grid is off, the battery can be used as EPS by the energy storage converter to supply power to the local load.

Compared with traditional EPS, the energy storage converter has high charging power and shorten the charging time, so it is suitable for emergency power supply.

Traditional EPS with power frequency transformer, large size, low efficiency;the energy storage converter converter as EPS with small size and high efficiency.

## DC power aging

DC power , such as EV module, plant power module, telecom module, etc., in the aging process, if there is resistance load or electronic load, there will be huge power loss.If the DC power is connected to the V2G module in the aging process, the electric energy will be fed back to the power grid, which will save at least 95% of the electric energy, save the owner's electricity charge, and save the owner's production cost.

# Technical Specification

| Productname | | V2G bidirectionalpower module |
|---|---|---|
| Productmodel | | IBG48105 |
| Charging part | | |
| AC side parameter | Ratedgrid voltage | 230Vac(220/230/240Vac canset) |
| | Grid voltagerange | 176Vac~ 265Vac |
| | Grid voltage frequency | 50/60± 10% (50/60Hzself-adapting) |
| | Voltage systems | L/N+PE |
| | Input current | ≤24A |
| | powerfactor | ≥0.99，full load |
| | THD of Current | <3%，full load |
| Battery side parameter | Output voltage | 10~ 100VDC,rated 48VDC |
| | Output rated current | 105A |
| | Ratedpower | 5kW |
| | Chargeefficiency | 94% |
| | Stabilized voltage precision | ± 0.5% |
| | Stabilizedcurrent precision | ± 1% |
| | Ripple factor | <1%Vo |
| Discharging part | | |
| Battery side parameter | Range battery voltage | 30~ 100VDC |
| | Dischargingcurrent | 105A Max |
| AC side parameter | V2G(on-grid discharging) | |
| | Grid voltage range | 176Vac~265Vac |
| | Grid voltage frequency | 50/60± 10% (50/60Hzself-adapting) |
| | Output power | 5kVA Max |
| | Power derating | / |
| | Efficiency | 94% |
| | On-grid/off-grid conversion time(ms) | 10 |
| | V2L（off-grid discharging） | |
| | Load voltagelevel | 230Vac(220/230/240Vac can set） |
| | Load voltage frequency | 50/60Hz±1% |
| | Total voltage harmonic distortion(THDu) | 3% |
| | Output power | 5kVA Max,Single-phase output |
| Other feature | | |
| Protect function | OV protection | Have |
| | OC protection | Have |
| | SC protection | Have |
| | OT protection | Have |
| Other parameter | Operating temperature | -30~ 65℃，55℃above output power derating |
| | Storage temperature | -40~ 75℃ |
| | Noise | <60dB |
| | Size (width*height*depth) | 220*520*86mm |
| | Weight | 8Kg |
| | Level of protection | IP20（single module） |
| | Typeof cooling | Intelligent speed regulation, forced air cooling |
| Approval standards | Performance/safety/ Environment | Meet the standards for energy storage converters, namely:<<GB/T34120-2017 technical specification for power conversion system of electrochemical energy storage system>><br><<GB/T 34133-2017 testing code for power converter of electrochemical energy storage system>> |
| | EMC | The Class A technical conditions meet the following standards, namely:<br><<GB/T 34120-2017 technical specification for power conversion system of electrochemical energy storage system>><br><<GB/T 34133-2017 testing code for power converter of electrochemical energy storage system>> |




## Bidirectional high frequency isolated DC/DC module（20kW / 15kW）

The DC/DC module adopts HF isolated bidirectional transformation technology, namely soft switch resonance technology, with high efficiency, and bidirectional energy flow of converter, automatic conversion of charge and discharge; adopts DSP design, support module parallel function, support CAN/RS485 communication, convenient communication and control with the third party equipment.

The power module is widely used in common DC bus application scenarios, such as photovoltaics storage and charge Integration, storage and charge Integration, storage charge and inspection Integration, retired battery use of energy storage, vehicle and grid interaction V2G, and other multi-energy complementary scenarios, battery and common DC bus HF isolation, it is the preferred product in the bidirectional energy flow application industry.

# Highlight

## More safe and reliable

Full high frequency isolation design to ensure safety between battery and DC bus;
DSP+CPLD digital control, multi – level software and hardware overcurrent, overvoltage, overtemperature protection, safe and reliable;
Reliable parallel function, convenient power expansion, up to 16 modules parallel.

## Higher efficiency

The DC/DC adopts soft switch resonance technology, with the highest efficiency up to 97%;
Compared with the traditional non-isolated DC/DC, the power frequency transformer is reduced in the system application, and the efficiency of high frequency isolation is higher, reaching more than 97%.

## More intelligent and friendly

Covering multiple battery voltage classes of passenger vehicles (100V~750Vdc), with wide battery voltage range;
Wider DC bus voltage, easy access to a variety of specifications of common DC bus.

## Lower cost

Compared with the traditional bidirectional module, HF isolation eliminates the power frequency isolation transformer and the system cost is low.
Through a circuit, the two functions of charging and inverter, charging and discharging are integrated in one, low cost.

## More flexible configuration

Support standard rack installation, compact structure;
Rmodule hot plugging design, flexible system configuration;
It is convenient for system integrator to design different kinds of photovoltaics storage charge and inspection Integration, storage and charge integration flexibly.



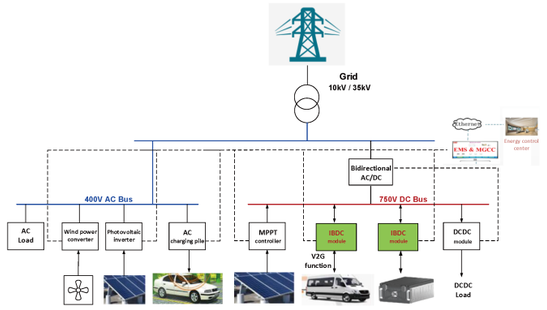
# Application

## Photovoltaics storage charge and inspection Integration etc multi-energy complementary application scenario

Multi-energy complementary application scenarios, such as large EV charging stations, photovoltaics storage and charge Integration stations use clean energy power supply, by storing electric energy after photovoltaic generation, photovoltaic, energy storage and charging facilities constitute a micro-grid, which can intelligently interact with the public power grid according to requirement, The use of energy storage system can also mitigate the impact on regional power grid when EV charging piles are charged at the same time,peak cutting and valley filling,and earn the price difference.Adopting common DC bus power supply scheme, Inverter, PCS, EV module, DCDC load, etc., reduces the AC/DC part, reduces the investment cost, and improves the system efficiency.

Electric vehicle energy storage V2G is a bidirection DC charging pile, which can be charged and discharged to realize bidirection interaction and exchange of energy between electric vehicle energy and power grid in a controlled state.

Storage charge and inspection integration, by discharging electric vehicle or battery pack, check and verify the battery capacity, and calculate the attenuation degree of battery capacity.




## Parallel balanced control of UPS battery pack

Medium and high-power UPS is usually connected in parallel with multiple groups of batteries, each battery is connected to the DCDC module,when the consistency between battery packs is poor, the DCDC module adjusts by boosting and balancing,control the current balance between the battery packs, suppress the circulation between the battery packs, ensure the UPS and the battery system to work reliably, and extend the battery life.

## Mobile energy storage vehicle

Mobile energy storage vehicle, which is loaded with large capacity batteries, uses the DCDC module,it can realize various application scenarios such as charging the electric vehicle and supplying power to DC load. The electric vehicle uses the DCDC module to supply power to DC load to realize energy storage V2L of electric vehicle.

# Technical Specification

| Productname | | BidirectionalHF isolation DCDC module | |
|---|---|---|---|
| Productmodel | | IBDC72027 | IBDC30050 |
| Charging part | | | |
| DC bus side parameter | DCbus voltage range | 600~ 850VDC | 600~ 850VDC |
| | DC bus current | ⩽32A | ⩽25A |
| battery side parameter | Outputvoltage | 200~750VDC,rated500VDC | 40~300VDC, rated 150VDC |
| | Outputrated current | 40A MAX | 100A MAX |
| | Output rated power | 20kW | 15kW |
| | Output powerderating | above 500Vdc constant power 20kW, below 500Vdc constant 40Acurrent | above150Vdc constant power 15kW,below150Vdc constant 100Acurrent |
| | Chargeefficiency | 97% Max | |
| | Stabilized voltage precision | ± 0.5% | |
| | Stabilized current precision | ± 1% | |
| | Ripplefactor | <1%Vo | |
| Discharging part | | | |
| Battery side parameter | Voltagerange | 200~ 750VDC | 40~ 300VDC |
| | Batteryside current | 40A MAX | 100A MAX |
| DC busside parameter | DC bus voltage range | 600~ 850VDC | 600~ 850VDC |
| | Output rated power | 20kW | 15kW |
| | Output power derating | Battery side over 500V constant power20 kW,constant 40A current below 500V | constant power of battery si de above 150V is15KW,cons tant100Acurrent below150V |
| | Dischargeefficiency | 97% Max | |
| Other feature | | | |
| Protect function | OV protection | Have | |
| | OC protection | Have | |
| | SC protection | Have | |
| | OT protection | Have | |
| Other parameter | Operating temperature | −30~ 65℃， 55℃above output power derating | |
| | Storage temperature | −40~ 75℃ | |
| | Noise | <60dB | |
| | Size (width*height*depth) | 226*86*575mm | |
| | Weight | 11kg | 10kg |
| | Level of protection | IP20 ( singlemodule) | |
| | Type of cooling | Intelligent speed regulation, forced air cooling | |
| Approval standards | safety | <<GB/T 34120−2017 technical specification for powerconver sion system of electrochemical energy storage system>> | |
| | EMC | GB 9254−2008 | |


## Bidirectional high frequency isolated DC/DC module (5kw/10kw)

The DC/DC module adopts HF isolated bidirection transformation technology, namely soft switch resonance technology, with high efficiency, and bidirectional flow of converter energy, automatic conversion of charge and discharge;adopts DSP design, support module parallel function, support CAN/RS485 communication, convenient communication and control with the third party equipment.

The power module is widely used in common DC bus application scenarios, such as photovoltaics storage and charge Integration, storage and charge Integration, storage charge and inspection Integration, retired battery use of energy storage, vehicle and grid interaction V2G, and other multi−energy complementary scenarios, battery and common DC bus HF isolation, it is the preferred product in the bidirectional energy flow application industry.

# Highlight

## More safe and reliable

Full HF isolation design to ensure safety between battery and DC bus;
DSP+CPLD digital control, multi – level software and hardware overcurrent, overvoltage, overtemperature protection, safe and reliable;
Reliable parallel function, convenient power expansion, up to 16 modules parallel.

## Higher efficiencyHigher efficiency

The DC/DC adopts soft switch resonance technology, with the highest efficiency up to 97%;
Compared with the traditional non-isolated DC/DC, the power frequency transformer is reduced in the system application, and the HF isolation efficiency is higher, reaching more than 97%.

## More intelligent and friendly

Covering multiple battery voltage classes of passenger vehicles (10V~100Vdc), with wide battery voltage range;
Wider DC bus voltage, easy access to a variety of specifications of common DC bus.

## Lower cost

Compared with the traditional bidirectional module, HF isolation eliminates the power frequency isolation transformer and the system cost is low.
Through a circuit, the two functions of charging and inverter, charging and discharging are integrated in one, low cost.

## More flexible configuration

Support standard rack installation, compact structure;
Module hot plugging design, flexible system configuration;
It is convenient for system integrator to design different kinds of photovoltaics storage charge and inspection Integration, storage and charge integration flexibly.



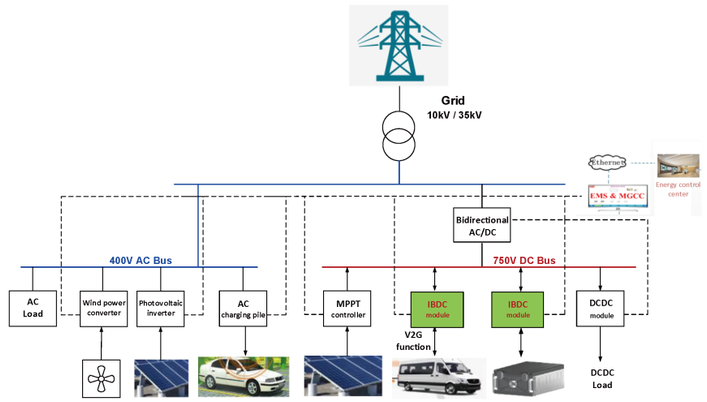
# Application

## Photovoltaics storage charge and inspection Integration,etc., multi-energy complementary application scenario

Multi-energy complementary application scenarios, such as large EV charging stations, photovoltaics storage and charge Integration stations use clean energy power supply, by storing electric energy after photovoltaic generation, photovoltaic, energy storage and charging facilities constitute a micro-grid, which can intelligently interact with the public power grid according to requirement, The use of energy storage system can also mitigate the impact on regional power grid when EV charging piles are charged at the same time,peak cutting and valley filling,and earn the price difference.Adopting common DC bus power supply scheme, Inverter, PCS, EV module, DCDC load, etc., reduces the AC/DC part, reduces the investment cost, and improves the system efficiency.

Electric vehicle energy storage V2G is a bidirection DC charging pile, which can be charged and discharged to realize bidirection interaction and exchange of energy between electric vehicle energy and power grid in a controlled state.

Storage charge and inspection integration, by discharging electric vehicle or battery pack, check and verify the battery capacity, and calculate the attenuation degree of battery capacity.



# Application

## Communication base station energy storage

The rated voltage of the battery of the communication base station is mostly about 48Vdc. In the common DC bus application scenario,uses the module can realize the energy storage of lead-acid battery retired cascade utilization by communication base station.Batteries are grouped into separate modules to reduce cell circulation and extend battery life.

## Vehicle-mounted mobile energy storage

Mobile energy storage vehicle, which is loaded with large capacity batteries, uses the DCDC module can realize various application scenarios such as charging the vehicle and supplying power to DC load.

The electric vehicle uses the DCDC module to supply power to DC load to realize energy storage V2L of electric vehicle.



# Technical Specification

| Product name | | bidirecti on HF isolation DCDC module | |
|---|---|---|---|
| Product model | | IBDC48208 | IBDC48104 |
| Charging part | | | |
| DC bus side parameter | DC bus voltage range | 480～850VDC | 240～420VDC |
| | DC bus current | ⩽16A | ⩽16A |
| Battery side parameter | Output voltage | 40～60VDC | |
| | Output rated current | 240A MAX | 120A MAX |
| | Output rated power | 10kW | 5kW |
| | Output power derating | Constant power above 42Vdc is 10kW, constant current below 42V is 240A | Constant power above 42Vdc is 5kW, constant current below 42V is 120A |
| | Charge efficiency | 97% Max | |
| | Stabilized voltage precision | ± 0.5% | |
| | Stabilized current precision | ± 1% | |
| | Ripple factor | <1%Vo | |
| | Soft start time | 3s⩽t⩽8s | |
| Discharging part | | | |
| Battery side paramete | Battery side voltage range | 40～60VDC | |
| | Battery side current | 240A MAX | 120A MAX |
| DC bus side parameter | DC bus voltage range | 480～850VDC | 240～420VDC |
| | Output rated power | 10kW | 5kW |
| | Output power derating | Constant power above 42Vdc is 10kW, constant current below 42V is 240A. | Constant power above42Vdc is 5kW, constant current below 42V is 120A. |
| | Discharge efficiency | 97% Max | |
| Other feature | | | |
| Protect function | OV protection | Have | |
| | OC protection | Have | |
| | SC protection | Have | |
| | OT protection | Have | |
| Other parameter | Operating temperature | －30～65℃，55℃ above output power derating | |
| | Storage temperature | －40～75℃ | |
| | Noise | <60dB | |
| | Size (width*height*depth) | 220*132*520mm | 220*86*520mm |
| | Weight | 10kg | 7kg |
| | Level of protection | IP20（single machine） | |
| | Type of cooling | Forced air cooling | |
| A pproval standards | Safety | <<GB/T 34120－2017 technical specification for power conversion system of electrochemical energy storage system>> | |
| | EMC | GB 9254-2008 | |

## Modular PCS (Rated 250kW)

Modular PCS is constructed with V2G HF isolation module, which has the advantages of HF isolation and modular, the cabinet is compatible with IBG75027 and IBG30050 modules,PCS with different power levels and different battery voltages can be flexibly configured according to requirements.

The PCS is widely used in such scenarios as retired battery echelon utilization, DC power aging and other medium power ESS(below 500kW).



# Highlight

### More safe and reliable

Full HF isolation design to ensure safety between battery and grid/load;
Battery friendly, battery group access, reduce battery parallel, avoid battery circulating current problem, extending battery life;
Compatible with DC side battery pack of different manufacturers and different characteristics access different PCS module;
Friendly to the power grid, AC side connected together, a single − machine characteristics.

### Higher efficiency

The HF isolation between the battery and the power grid can reduce the power frequency transformer. The HF isolation efficiency is higher, reaching more than 95%.

### More intelligent and friendly

Cooperate with STS module to support seamlessly switch from on−grid to off−grid;
Covering multiple battery voltage classes of passenger vehicles (40V~750Vdc), with wide battery voltage range;

### Lower cost

Compared with the traditional modular energy storage system, HF isolation reduces the power frequency isolation transformer and indirect costs (cabinet, fan, etc.)，lower system cost ;
Through a circuit, the two functions of charging and inverter, charging and discharging are integrated in one, lower cost.

### More flexible configuration

Support 19 inches standard rack mount, compact structure;
Module hot plugging design, flexible system configuration;
PCS with different power levels and battery voltage levels can be flexibly configured according to requirements.

# Application

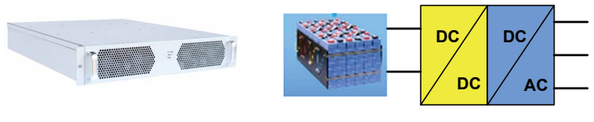
## Energy storage system ( retired battery utilization)

This product is a modular PCS, which is very suitable for retired,old and different type of power batteries utilization as energy storage system. The power range is 15kW~250kW. It is suitable for energy storage system in industrial and commercial parks.The flexible embedded PCS solution provides core PCS modules, which is convenient for system integrator to design different forms of energy storage system flexibly;isolated bidirectional AC/DC converter has higher safety, higher efficiency and smaller size after being connected to the battery;

On-grid and off-grid all-in-one machine, which can be switched to battery supplied power after the power grid is off, suitable for micro-grid (island, remote village, etc.) scenarios;

Wide voltage range, very suitable for vehicle retired power battery echelon application;

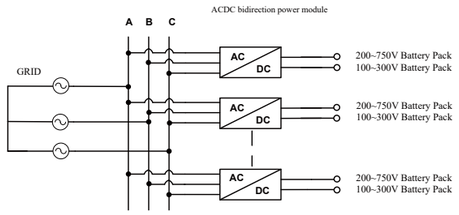
Can be configured as mobile energy storage system, suitable for G20 summit, Boao Forum, college entrance examination and other important power supply scenario.






## Battery forming and capacity division

FIG. 2 shows the bidirectional HF isolated module used for battery forming and capacity division. The battery pack group access module eliminates the power frequency transformer, making the system more efficient and smaller in size.




## DC power aging

DC power , such as EV module, plant power module, telecom module, etc., in the aging process, if there is resistance load or electronic load, there will be huge power loss.If the DC power is connected to the V2G module in the aging process, the electric energy will be fed back to power grid, which will save at least 95% of the electric energy, save the owner's electricity charge, and save the owner's production cost.



# Technical Specification

| Product name | | HF isolated PCS | |
|---|---|---|---|
| Product model | | IBG75027-250K | IBG30050-180K |
| Charging part | | | |
| AC side parameter | Rated grid voltage | 400Vac ( 380/400/415Vac can set) | |
| | Grid voltag e range | 304Vac ~ 485Vac | |
| | Grid voltage frequency | 50/60 ± 10% (50/60Hz self-adapting) | |
| | Voltage systems | Three-phase four-wire ( 3W+PE ) | |
| | Input current | ≤ 456A | ≤ 297A |
| | Power factor | ≥ 0.99, full load | |
| | THD of Current | <3%, full load | |
| Battery side parameter | Output voltage | 200 ~ 750VDC, rated 500VDC | 100 ~ 300VDC, rated 150VDC |
| | Output rated current | 480A | 1200A |
| | Rated power | 250kW | 180kW |
| | Power derating | 323Vac ~ 485Vac input, full load output | 304Vac ~ 485Vac input, full load output |
| | Charge efficiency | 95% Max | |
| | Stabilized voltage precision | ± 0.5% | |
| | Stabilized current precision | ± 1% | |
| | Ripple factor | <1%Vo | |
| Dis charging part | | | |
| Battery side parameter | Grid voltage | 200 ~ 750VDC, rated 500VDC | 100 ~ 300VDC, rated 150VDC |
| | Dis charging current | 480A Max | 1200A Max |
| AC side parameter | V2G(on-grid discharging) | | |
| | Grid voltage range | 304Vac ~ 485Vac | |
| | Grid voltage frequency | 50/60 ± 10%(50/60Hz self-adapting) | |
| | Output power | 250kW | 180kW |
| | Power derating | 323Vac ~ 485Vac input, full load output | 304Vac ~ 485Vac input, full load output |
| | Efficiency | 95% Max | |
| Other feature | | | |
| Protect function | OV protect ion | Have | |
| | OC protect ion | Have | |
| | SC protect ion | Have | |
| | OT protect ion | Have | |
| Other parameter | Operating temperature | -30 ~ 65℃, 55℃ above output power derating | |
| | Storage temperature | -40 ~ 75℃ | |
| | Noise | <65dB | |
| | Size (width*height*depth) | 600*800*2000mm(W*D*H) | |
| | Weight | 350Kg | 310Kg |
| | Level of protection | IP20 ( Whole cabinet ) | |
| | Type of cooling | Intelligent speed regulation, forced air cooling | |
| Approval stan dards | Performance/ Safety/ En vironment | <<GB/T 34120-2017 technical specification for power conversion system of electrochemical energy storage system>> | |
| | EMC | GB 9254-2008 | |

## On-grid and off-grid switching STS module

This on-grid and off-grid switching STS module adopts static switch seamless switching technology and supports on-grid and off-grid seamless switching;is designed with DSP and supports CAN/RS485 communication.This module is widely used in the application scenarios of on-grid and off-grid switching,such as weak power grid area, micro-grid energy storage system,etc.,to ensure the uninterruptible power supply of important loads.



# Highlight

## More safe and reliable

Three phase five wire system (3W+N+PE), support off-grid unbalanced load;

Cooperating PCS module,on-grid and off-grid seamless switching can be realized ,ensuring the uninterruptible power supply of important loads;

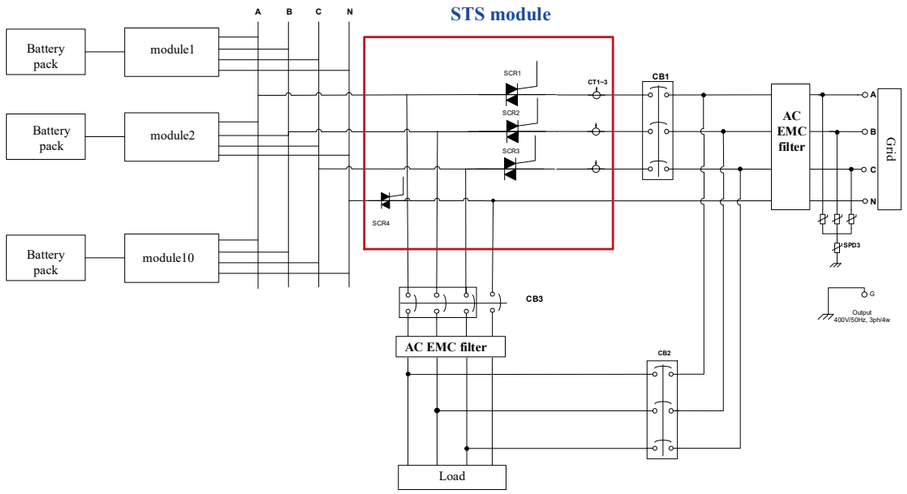
Modular design,easy installation and maintenance;

The module height is only 2U,with compact structure and high power density.

# Application

## Weak power grid area,micro-grid energy storage system

Application scenarios of weak power grid area and micro-grid energy storage system, when the grid is power on, bidirectional flow of energy between the battery and power grid can realize charging and discharging function, peak cutting and valley filling,and earn the price difference; when the grid is power off, transfer to battery power through STS module, to ensure the uninterruptible power supply of loads, used as emergency power supply.




# Technical Specification

| Product name | | STS module | | |
|---|---|---|---|---|
| Product model | | STS－60K | STS－100K | STS－200K |
| Electrical parameters | | | | |
| Electric parameters | System | Three phase five wire system （ 3W+N+PE ） | | |
| | Rated grid voltage | 380/400/415Vac | | |
| | Voltage range | 304~485Vac | | |
| | Rated frequency | 50Hz | | |
| | Frequency range | 45~55Hz | | |
| | Rated current | 92A | 152A | 304A |
| | Rated power | 60kW | 100kW | 200kW |
| | Overload capacity | 110%， long－term overload; 125%, overload 10 minutes | | |
| Other feature | | | | |
| Protect function | OV protection | Have | | |
| | OC protection | Have | | |
| | SC protection | Have | | |
| | OT protection | Have | | |
| | Backfeed protection | Have | | |
| Other parameters | Operating temperature | －30～65℃ ,55℃ above output pow er derat ing | | |
| | Storage temperature | －40～75℃ | | |
| | Noise | 65dB | | |
| | Size （ width*height*depth ） | 440*86*480mm | | 440*132*480mm |
| | Weight | 11kg | 15kg | 18kg |
| | Level of protection | IP20 （ single module ） | | |
| | Type of cooling | forced air－cooled | | |
| Approval standards | Performance/Safety/ Environment | <<GB/T 34120－2017 technical specification for power conversion system of electrochemical energy storage system>> | | |
| | EMC | GB 9254－2008 | | |