



OBC - COMPOSABLE CHARGING SYSTEM



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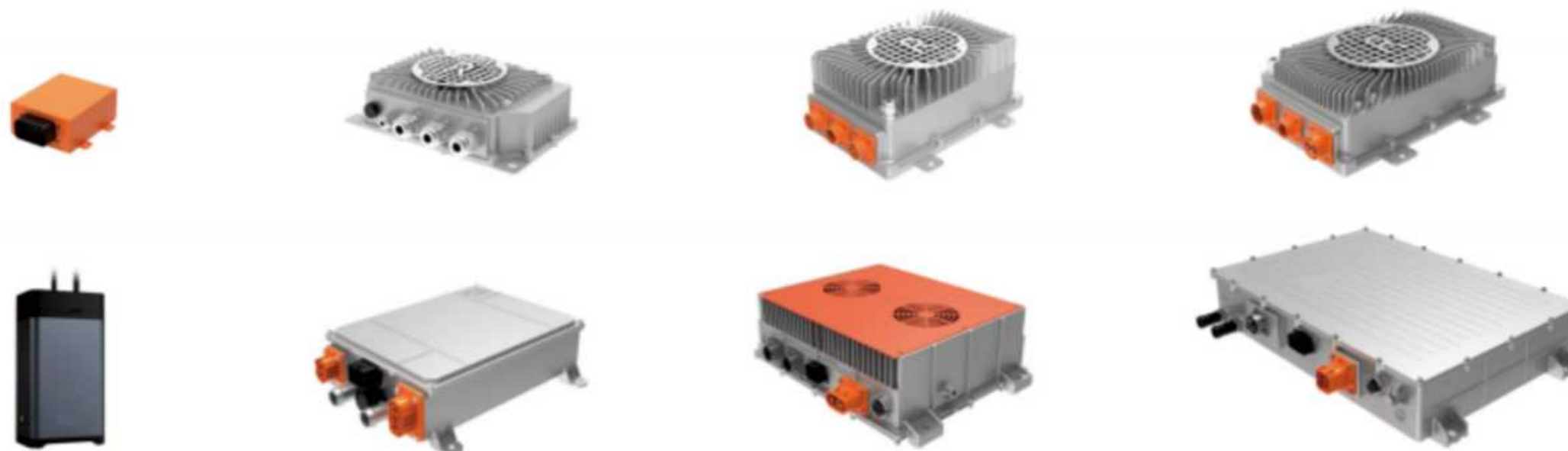
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RENHOTEC GROUP LIMITED



Assembly series

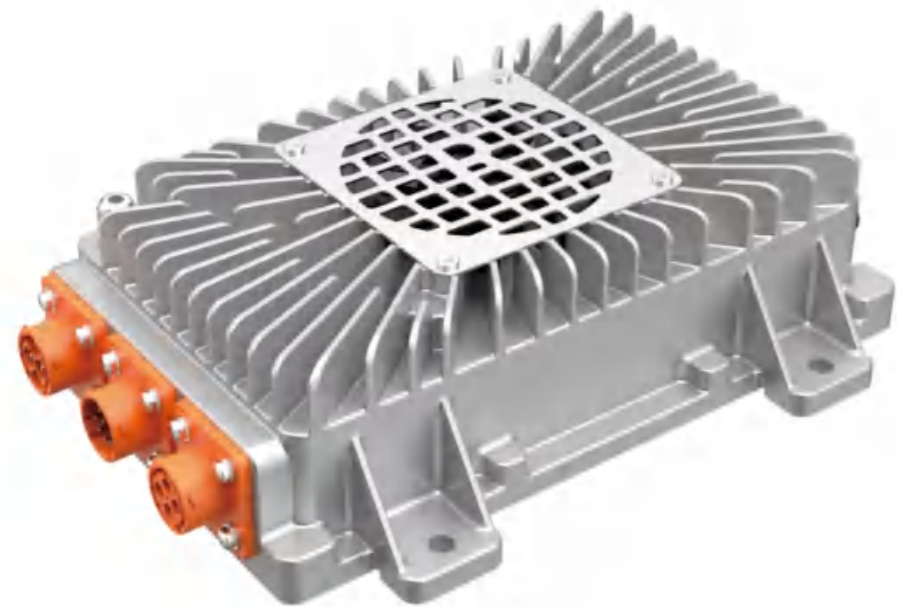
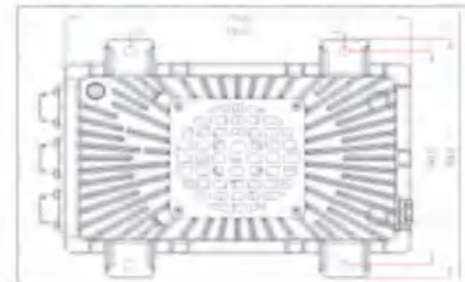
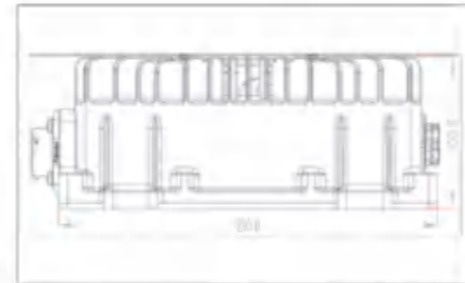
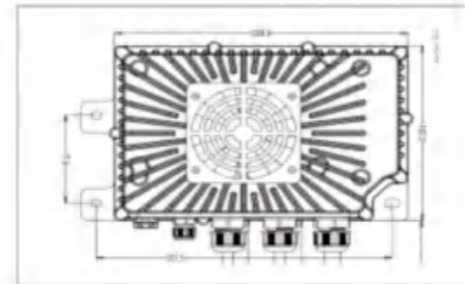
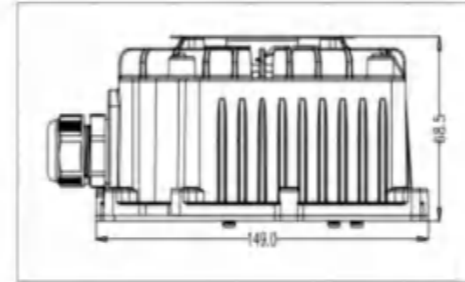


Mature mass production projects





1.2KW & 2.0KW Charger



The 1.2KW & 2.0KW on-board AC DC charger is a small volume, high-efficiency, intelligent, fully digital integrated charger specially designed for new low-speed Li-ion electric pure electric vehicles, electric motorcycles, electric forklifts, on-site work vehicles, large and medium-sized electric tools, and new energy tourism and sightseeing vehicles. Adopting a modular and standardized design approach, and adopting the new generation phase shift plus width modulation zero voltage zero current control soft switching technology, the system has strong stability, high conversion efficiency, and peak efficiency can reach over 96%. It has multiple protection functions such as overvoltage, undervoltage, overcurrent, undervoltage, over temperature, low temperature, and reverse.

It can be assembled as a single unit and installed in the front and rear compartments of new energy vehicles, directly connected to household AC power to use. It can also be combined with a 600W onboard DC DC module to form a dedicated two in one product for use in micro cars.

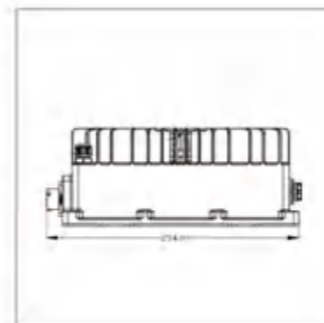
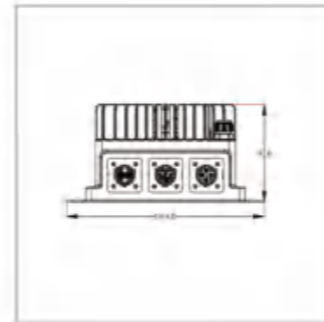
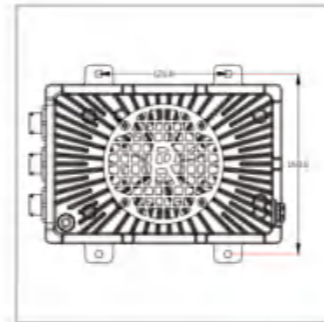
Technical Parameter

Voltage		24V	60V	72V	108V	144V	360V
Output	Output voltage(V)	15-32V	20-80V	30-90V	50-130V	110-180V	200-440V
	Output current(A)	0-60A	0-35A	0-25A	0-18A	0-13A	0-6A
Charging mode		Responsive mode					
Input	Rated input Voltage	220VAC					
	Input voltage range	90 ~ 265VAC					
	Rated input voltage frequency	50Hz					
	Input frequency range	45 ~ 65Hz					
	Starting impulse current	≤ 10A					
	Input power factor	≥ 0.99 (@220Vin, Pmax)					
Output	Rated output power	1.2KW		2KW			
	Voltage stabilization accuracy	≤ 1%					
	Ripple coefficient of voltage	≤ 1%					
	Current stabilization accuracy	≤ 5%					
	Output response time	≤ 5S					
Environment	Typical efficiency	≥ 93%					
	Operating temperature	-40 ~ 55°C					
	Storage temperature	-40 ~ 100°C					
	Humidity	5% ~ 95%					
Other	IP grade	Ip67					
	Cooling function	Forced air cooling					
	Communication	CAN bus control					
			(Received charging command to charge normally; charger in standby mode without command)				
Protections	Over voltage	Shutdown can self recover.					
	Low voltage	Shutdown can self recover.					
	Short circuit	Output short circuit shutdown can self recover.					
	Over temperature	Reduce the output power when the temperature of the heat sink is above 75 °C, disconnect the circuit when the temperature is above 95 °C, and resume output when the charging temperature returns to below 55 °C.					
	Reverse polarity	When the output connection is reversed, it does not start when powered on, alarms, and works normally after recovery					
	Battery balancing and grounding	The resistance between the conductive part of the vehicle charger that can be directly touched by the human body and the potential equalization point shall not exceed 0.1Ω. The grounding point of the on-board charger should have obvious grounding marks					
Safety regulations	Power shut down	Abnormal state cutting off power supply					
	Dielectric strength	Primary side - secondary side 3750VAC Primary side secondary side - housing 1500VAC					
	Clearances and creepage distances	Primary side - secondary side 4mm/6 mm Primary side secondary side - housing 2mm/3 mm					
	Insulation performance	20MΩ					
Reliability	harmonic current	Complies to GB17625.1-2003-6.7.3.1					
	Vibration resistance performance	After conducting frequency sweep vibration tests in X, Y, and Z directions, no damage was found to the components and no loosening of the fasteners					
	Impact resistance	Refer to GB/T15139-1994-6.5					
	Resistance to industrial solvents	Metal components have a good anti-corrosion coating					
	Salt spray resistance	Refer to GB/T 2423.17					
	Durability	Above standard GB/T 24347-2009					
Other	EMI	Complies to GB/T 18487.3-1.1.3.1					
	EMD	Complies to GB/T 18487.3-1.1.3.2					
	OBC N.W.	TBD					
		G.W.					
		Size					
		TBD					



3.3KW - Charger

The 3.3KW air-cooled on-board charger assembly is a general-purpose high-performance intelligent air-cooled charger assembly specifically developed for pure electric new energy vehicles such as li-ion pure electric class A+ passenger cars, commercial vehicles, logistics vehicles, specialized vehicles, and electric engineering machinery. Adopting a modular and standardized design approach, fully digital control technology, with flexible and intelligent control, good protection characteristics, and strong system robustness. Adopting the new generation phase shift and width modulation zero voltage zero current soft switching technology combined with high-performance SiC devices, the overall stability of the machine is strong, the conversion efficiency is high, and the peak efficiency can reach over 95%. The housing is made of die-cast aluminum, with an IP67 protection level; All key electronic devices are selected for automotive grade devices. The entire machine has high power density, light weight, small size, good environmental adaptability, easy maintenance, high reliability, and long service life. It can fully meet various charging application scenarios of new energy vehicles.



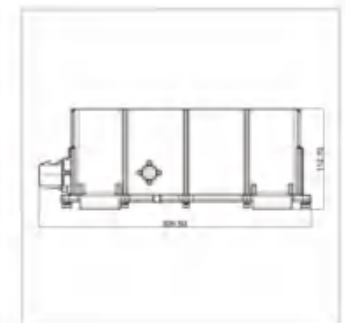
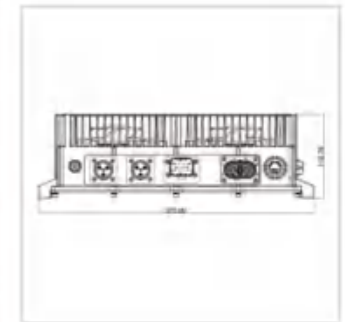
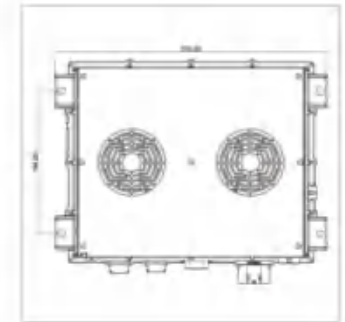
Technical Parameter

Voltage	24V	48V	72V	108V	144V	160V	
	15-20V	20-47V	30-60V	50-130V	110-190V	200-440V	
Output voltage(V)	0-100A	0-50A	0-30A	0-20A	0-15A	0-5A	
Output current(A)	Responsive mode						
Charging mode	220VAC						
Input	90 ~ 456VAC						
	50Hz						
	45 ~ 65Hz						
	≤ 16A						
	≥ 0.99 (@220Vin, P _{max})						
Output	3.3KW						
	≤ 1%						
	≤ 1%						
	≤ 5%						
	≤ 5S						
Environment	-40 ~ 55°C						
	-40 ~ 100°C						
	5% ~ 95%						
	Ip67						
	Forced air cooling						
CAN bus control							
Protections	Over voltage	Shutdown can self recover					
	Low voltage	Shutdown can self recover					
	Short circuit	Output short circuit shutdown can self recovers					
	Over temperature	Reduce the output power when the temperature of the case is above 75 °C, recover the output when the temperature is below 65 °C, and resume output when the charging temperature returns to below 65 °C					
	Reverse polarity	When the output connection is reversed, it does not start when powered on, alarm, and works normally after recovery					
	Battery balancing and grounding	The inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus					
	Power shut down	Abnormal state cutting off power supply					
	Safety regulations	Dielectric strength	Primary side - secondary side 3750VAC Primary side secondary side - housing 1500VAC				
		Clearances and creepage distances	Primary side - secondary side 4mm/3mm Primary side secondary side - housing 2mm/3mm				
		Insulation performance	20MΩ				
harmonic current		Complies to GB17625.1-2003-8.7.3.1					
Reliability	Vibration resistance performance	After conducting frequency sweep vibration tests in X, Y, and Z directions, no damage was found to the components and no loosening of the fasteners					
	Impact resistance	Refer to GB/T 15139 - 1994-6.5					
	Resistance to industrial solvents	Metal components have a good anti-corrosion coating					
	Salt spray resistance	Refer to GB/T 2423. 17					
Other	Durability	Above standard GB/T 24347 - 2009					
	EMI	Complies to GB/T 18487. 3-1.1. 3.1					
	EMD	Complies to GB/T 18487. 3-1.1. 3.2					
	OBC N.W.	TBD					
G.W.	TBD						
Size	TBD						
(Received charging command to charge normally; charger in standby mode without command)							



6.6KW Fast&slow charging integrated Charger

With the development of new energy vehicles, AC and DC charging stations are becoming increasingly popular. DC charging stations generally output 200- 750VDC, while the energy storage batteries of electric motorcycles (or other specialized vehicles) are mostly 48V (or 144V/72V/24V, etc.) low voltage and cannot be directly charged by fast charging stations. Thus we designed a 6.6KW customized car charging power supply that can be compatible with various charging standards. When the vehicle is connected to an AC charging station or industrial AC power, the customized power system can automatically recognize and operate in AC charging mode. When externally connected to a DC charging station, the charger can work compatibly in a DC to DC state, converting 200-750V DC to low voltage DC such as 48V/24V/72/96/144V to charge the energy storage battery. Realize multiple compatible and multi mode charging methods such as AC charging stations, portable AC charging guns, DC charging stations, portable DC charging stations, industrial AC ports, and household AC power.



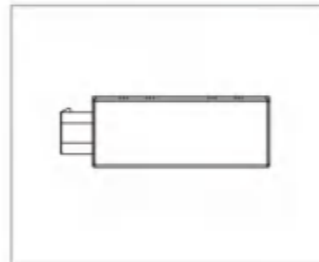
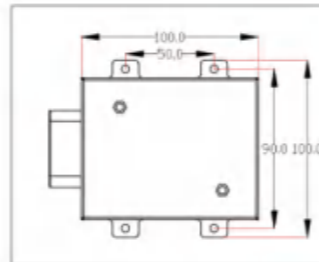
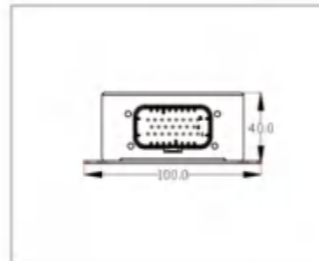
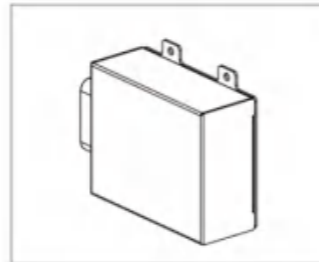
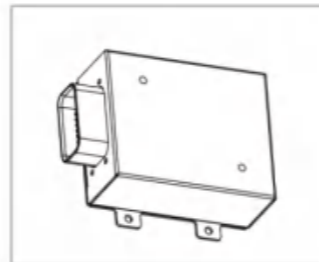
Technical Parameter

Voltage	24V	60V	80V	108V	144V	
	0-36V	0-78V	0-102V	0-136V	0-180V	
Output voltage(V)	0-150A	0-100A	0-75A	0-54A	0-42A	
Output current(A)	Responsive mode					
Charging mode	220VAC					
Input	90 ~ 456VAC					
	50Hz					
	45 ~ 65Hz					
	≤ 32A					
	≥ 0.99 (@220Vin, P _{max})					
Output	6.6KW					
	≤ 1%					
	≤ 1%					
	≤ 5%					
	≤ 5S					
Environment	-40 ~ 55°C					
	-40 ~ 100°C					
	5% ~ 95%					
	Ip67					
	Forced air cooling					
CAN bus control						
Protections	Over voltage	Shutdown can self recover				
	Low voltage	Shutdown can self recover				
	Short circuit	Output short circuit shutdown can self recover				
	Over temperature	Reduce the output power when the temperature of the case is above 75 °C, recover the output when the temperature is below 65 °C, and resume output when the charging temperature returns to below 65 °C				
	Reverse polarity	When the output connection is reversed, it does not start when powered on, alarm, and works normally after recovery				
	Battery balancing and grounding	The inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus, the inverter controls the vehicle bus and the vehicle charger bus circuit directly via CAN bus				
	Power shut down	Abnormal state cutting off power supply				
	Safety regulations	Dielectric strength	Primary side - secondary side 3750VAC Primary side secondary side - housing 1500VAC			
		Clearances and creepage distances	Primary side - secondary side 4mm/3mm Primary side secondary side - housing 2mm/3mm			
		Insulation performance	20MΩ			
harmonic current		Complies to GB17625.1-2003-8.7.3.1				
Reliability	Vibration resistance performance	After conducting frequency sweep vibration tests in X, Y, and Z directions, no damage was found to the components and no loosening of the fasteners				
	Impact resistance	Refer to GB/T 15139 - 1994-6.5				
	Resistance to industrial solvents	Metal components have a good anti-corrosion coating				
	Salt spray resistance	Refer to GB/T 2423. 17				
Other	Durability	Above standard GB/T 24347 - 2009				
	EMI	Complies to GB/T 18487. 3-1.1. 3.1				
	EMD	Complies to GB/T 18487. 3-1.1. 3.2				
	OBC N.W.	TBD				
G.W.	TBD					
Size	TBD					
(Received charging command to charge normally; charger in standby mode without command)						



CC/CP Control module

Add this module to solve the problem of the original charger being unable to use a public charging station to charge new energy vehicles, enabling intelligent interaction with the charging station.



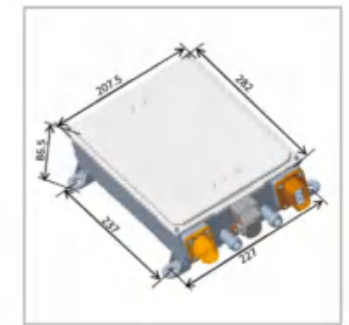
Auxiliary control module ACM function

Requirements	Charging control guidance and connection confirmation(CC CP)
	CAN communication
	Hard wire wake-up VCU
	VCU hard wire wake-up ACM
	Charging port lighting
	Charging lid status recognition
	Charging stand light control (3 colors)
	Charging cable temperature detection
	Electronic lock control



6.6KW Water-cooled bidirectional machine

In order to meet the new application scenarios of convenient and efficient vehicle charging, as well as providing power for homes, outdoor travel equipment, vehicle to power grid, and vehicle to vehicle mutual charging, the On-Board Charger (OBC) is transitioning from a unidirectional topology to a bidirectional topology. The use of bidirectional OBC to improve system efficiency is a new trend in the future; Its working principle is to convert alternating current into high-frequency direct current using a power source, and output it to the battery pack after being transformed by an intermediate transformer, achieving rapid charging of the battery. When the battery needs to be discharged, bidirectional OBC converts the direct current in the battery into high-frequency alternating current through reverse control, and outputs it to AC for charging other vehicles through the conversion of isolation transformers.



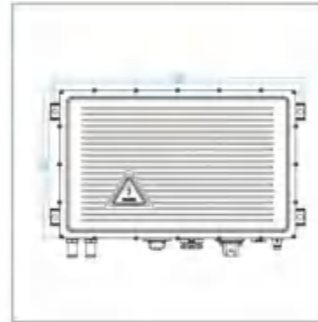
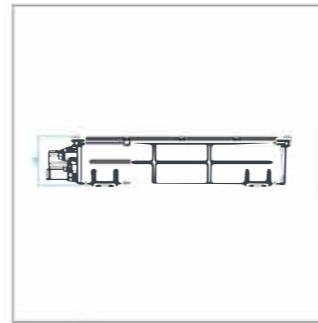
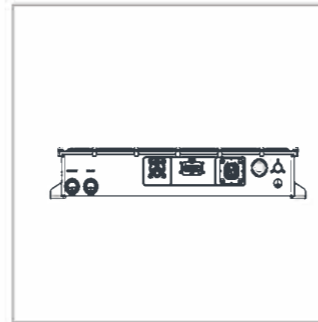
Technical Parameter

Charger		DC/DC	
Output voltage range	AC200V~450V	Input voltage range	AC200V~450V
Rated power	6.6kw	Rated power	2.5KW
Frequency range	47Hz~63Hz	Peak power	3KW continue 6 minutes
Full load power factor	≥0.99	Output voltage	14V±1%
Full load efficiency	≥94.5%	Output current	148A
IP grade	IP67	Highest efficiency	≥92%
Working temperature	-40°C ~ 85°C (水温≤65°C)	Voltage regulation	1%
Storage temperature	-40°C ~ 100°C	Voltage stabilization accuracy	≤1%
Charging control	CAN bus	Current stabilization accuracy	≤2%
Dimensions	280(L)x205.5(W)x67(H)	Working temperature	-40°C~85°C (水温≤65°C)
Cooling	Water cooling	Storage temperature	-40°C ~ 100°C
		Control method	Control via CAN bus or enable line



20KW water-cooled special vehicles on board power supply

The 20KW on-board power supply for special vehicles is a high-power, water-cooled, high protection, and high power density DC DC DC power supply developed specifically for the installation system of special vehicles such as hybrid armored vehicles, emergency rescue vehicles, radio special vehicles, and special carrier vehicles. The system is designed using fully digital control technology, with flexible and intelligent control, good protection characteristics, and strong system robustness. Adopting the new generation phase shift and width modulation zero voltage zero current soft switching technology combined with high-performance SiC IGBT devices, the overall stability of the machine is strong, the conversion efficiency is high, the rated power is 20 kW, and the peak power can reach over 30 kW. The shell is made of die-cast aluminum, with an IP67 protection level and is dustproof and waterproof; The entire machine has high power density, light weight, small size, good environmental adaptability, easy maintenance, sufficient margin, high reliability, and long service life. It can fully meet various high-power installation system power supply scenarios.

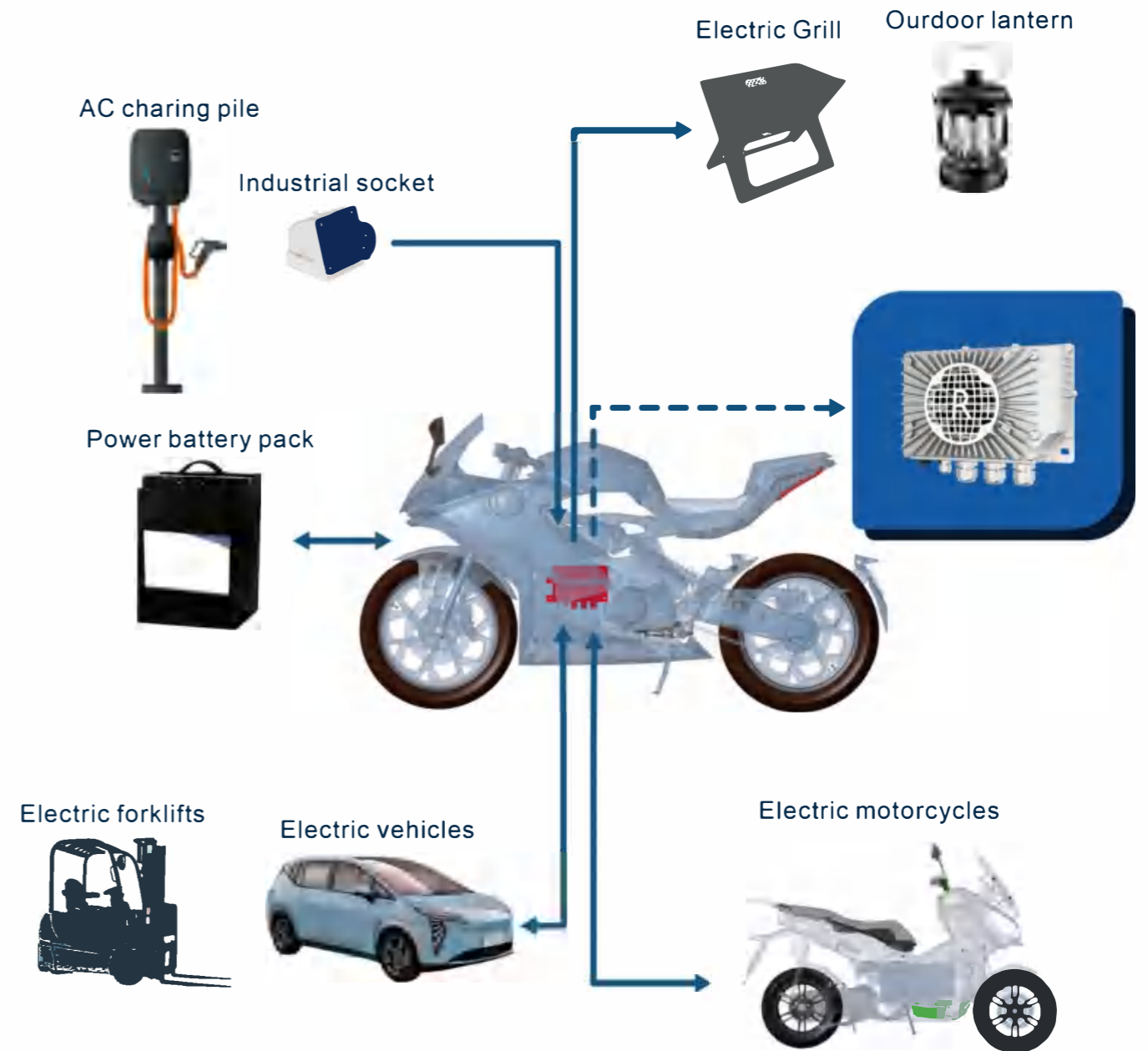


Technical Parameter

Spe.	Model	20KW			
	Rated output power	20KW			
	Peak output power	24000W(10S)			
	Isolation	Isolative			
	Communication	CAN			
Input	Rated input voltage (V)	360	540		
	Input voltage range (V)	200-450	400-700		
	Rated input current (A)	64	40		
	Starting impulse current (A)	≤64	≤40		
	Output	Rated output voltage (V)	80	400	80
Rated output current (A)		250	50	250	50
Voltage and current stabilization accuracy		≤1% & ≤5%			
Output response time		≤200ms			
Typical working efficiency		≥92%			
Other	Cooling method	Liquid cooling			
	IP grade	Ip67			
	Working temperature	-20°C~+65°C			
	Working humidity	5-95%RH			
	Size (mm)	350*550*100			
	Weight	15Kg±1Kg			

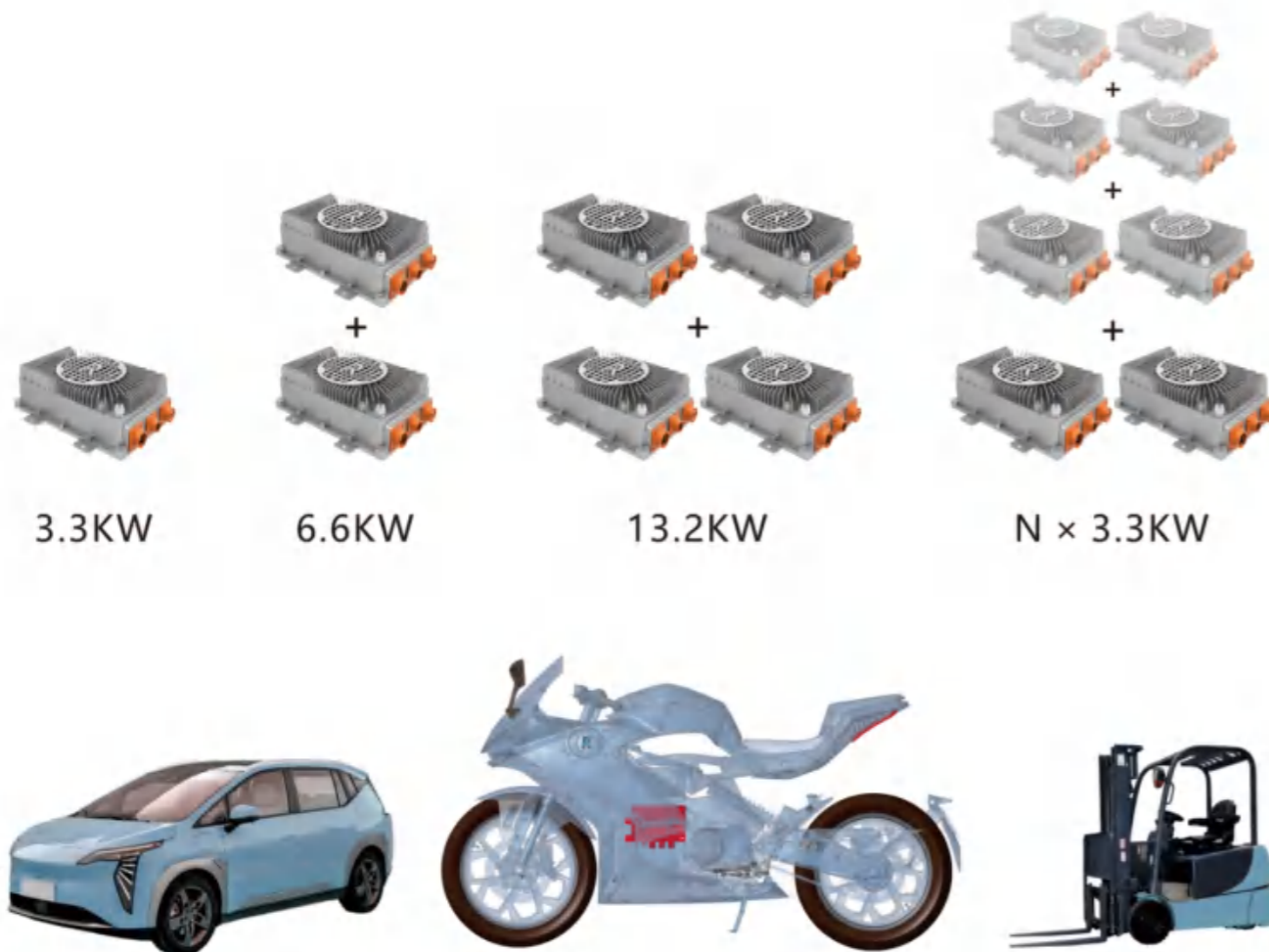
Bidirectional OBC

In order to meet the new application scenarios of convenient and efficient vehicle charging, as well as providing power for homes, outdoor travel equipment, vehicle to power grid, and vehicle to vehicle mutual charging, the On-Board Charger (OBC) is transitioning from a unidirectional topology to a bidirectional topology. The use of bidirectional OBC to improve system efficiency is a new trend in the future; Its working principle is to convert alternating current into high-frequency direct current using a power source, and output it to the battery pack after being transformed by an intermediate transformer, achieving rapid charging of the battery. When the battery needs to be discharged, bidirectional OBC converts the direct current in the battery into high-frequency alternating current through reverse control, and outputs it to AC for charging other vehicles through the conversion of isolation transformers.





OBC - Composable charging system



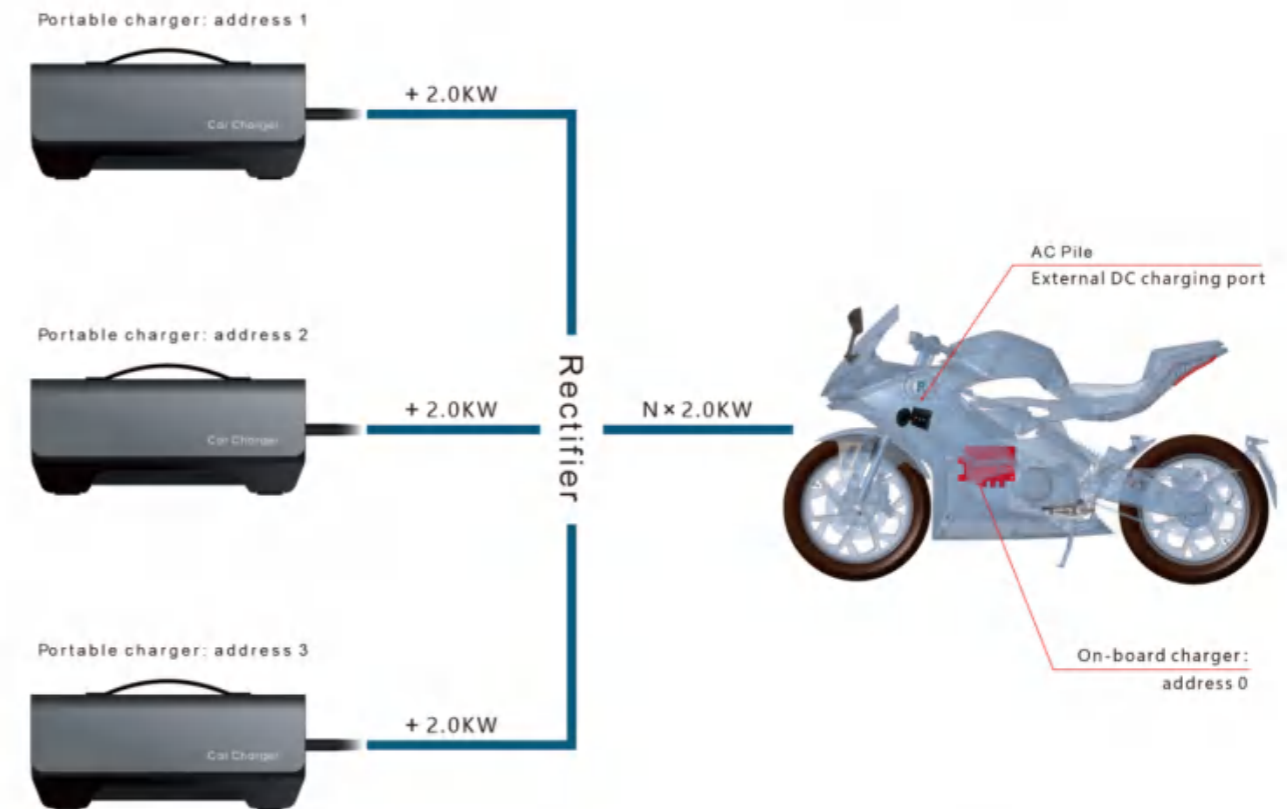
Parallel connection system

1. The module autonomous combination N+X has no master-slave current balancing and does not require an external current balancing control board .
2. If one of them fails, the other connected modules will continue to work normally and the total power will be automatically adjusted .
3. In parallel mode, if any modules are offline, the address can be accurately located through messages.
4. Through the PC software, the working status of each module can be monitored .
5. Address setting: Set the address through the dial switch on the module .



2.0KW Portable charger

The 2.0KW on-board AC DC charger is a small volume, high-efficiency, intelligent, fully digital integrated charger specially designed for new low- speed Li-ion pure electric vehicles, electric motorcycles, electric forklifts, on-site work vehicles, large and medium-sized electric tools, and new energy tourism and sightseeing vehicles . Adopting a modular and standardized design approach , and adopting the new generation phase shift plus width modulation zero voltage zero current control soft switching technology, the system has strong stability, high conversion efficiency , and peak efficiency can reach over 96% . It has multiple protection functions such as overvoltage , undervoltage , overcurrent , over temperature , low temperature , short circuit and reverse .



Technical Parameter

Voltage		24V	60V	72V	108V	144V	360V
Output	Output Voltage(V)	15-32V	20-80V	30-90V	50-130V	110-180V	200-440V
	Output Current(A)	0-60A	0-35A	0-25A	0-18A	0-13A	0-6A
	Charging mode	Responsive mode					
Input	Rated input voltage	220VAC					
	Input voltage range	90 ~ 265VAC					
	Rated input voltage frequency	50Hz					
	Input frequency range	45 ~ 65Hz					
	Starting impact current	≤ 10A					
	Input power factor	≥ 0.99 (@220Vin,Pomax)					
	Rated output power	2KW					
Environment	Voltage stabilization accuracy	≤ 1%					
	Voltage ripple factor	≤ 1%					
	Current stabilization accuracy	≤ 5%					
	Output response time	≤ 5S					
	Typical efficiency	≥ 93%					
	Operating temperature	-40 ~ 55°C					
Storage temperature	-40 ~ 100°C						
Humidity	5% ~ 95%						
IP grade	Ip67						
Cooling function	Forced air cooling						
Communication	CAN bus						