

## **CORPORATE VISION**

To be a world-class enterprise in the field of transportation and energy



# **PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS**



ZHUZHOU CRRC TIMES ELECTRIC CO., LTD.

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**PHOTOVOLTAIC INVERTER** PRODUCTS AND SYSTEM SOLUTIONS



# CONTENTS





#### CRRC ZHUZHOU INSTITUTE CO., LTD.

CRRC Zhuzhou Times Electric Co., Ltd.(TEC), a subsidiary of CRRC, was founded in September 2005. Its predecessor and parent company, CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd., was founded in 1959. Among the ten main bodies under CRRC Zhuzhou Institute, there are two listed companies, eleven national scientific research and innovation platforms, three enterprise postdoctoral workstations, five overseas technology R&D centers, and eleven overseas branches. We have nearly 7,000 R&D personnel, 1 academician of the Chinese Academy of Engineering over 2000 doctors and over 3,000 master's degrees.

CRRC Zhuzhou Institute adheres to innovation-driven development, and actively implements national strategies such as science and technology power, traffic power, emission peak and carbon neutrality and marine power. Based on transportation and energy, we have accumulated three core technologies of devices, materials, and algorithms and created eight major industrial sectors including rail transit, new materials, solar, and wind energy storage, power electronics, electric control of passenger vehicles, deep-sea equipment, industrial transmission, and Autonomous Rail Transit-ART. Innovation continues and leads.

Facing competitive future, CRRC Zhuzhou Institute aims to become a worldclass enterprise in the field of transportation, and energy, and has made unremitting efforts towards the goal of building an international, industrial group with leading technology, first class industry, high level efficiency and quality.

#### ZHUZHOU CRRC TIMES ELECTRIC CO., LTD.

Zhuzhou CRRC Times Electric Co., Ltd. is a joint-stock enterprise of China CRRC Co., Ltd. It was established in September 2005. Its predecessor and parent company, CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd. It was founded in 1959.

The company, which focuses on transportation and energy, and it is a national key high-tech enterprise integrating research and development, production, sales, and service. Its business involves high-speed rails, locomotives, urban rails, rail construction machinery, communication signals, high-power semiconductors, sensors, offshore equipment, new energy vehicles, general inverters used in renewable energy solutions for both Wind Turbine and PV systems plus other fields covering more than 20 countries and regions around the world.



The enterprise with independently developed controllable whole industrial chain of "chip-componentdevice-system" in China















#### drogen Power Supply Wind Power Converter



System Integration

**New Energy Power Generation Equipment of CRRC TEC** The fully independently developed IGBT effectively resolve the "chip crisis".



Fully independently developed IGBT technology

- Global provider of key IGBT components An industrialization platform of integration
- of global design and manufacturing capabilities
- Having complete industrial chain of "chip - module - power unit - whole machine"
- Leading in industry scale in China

Chip Platform Capability

- The 8 inch IGBT chip manufacture line. the first in China and the second in the world
- Chip technology, in line with the international top technology, highly independent, safe and controllable



- Laying equal stress on the standard and customized packaging technologies
- Package test capability with full voltage level

PHOTOVOLTAIC INVERTER PRODUCTS 03/04AND SYSTEM SOLUTIONS





Professional peak supply guarantee capacity

Meet the market demands flexibly

2

ELASTIC ●●●





22 Project coverage of provinces, cities and autonomous regions

20 Gwp+ Cumulative installed capacity

Listed on "Science and Technology Innovation Board", opened a new situation of A+H, and won the "Light Energy Cup" most influential photovoltaic inverter enterprise

6 National-level technology

innovation platforms

2

Postdoctoral workstations

21 Partner colleges and universities

Continuous high-level R&D investment in science and technology to achieve the photovoltaic industry



## 05/06 | PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

Provincial technology innovation platforms



Research institutes with R&D cooperation



# 07/08 | PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

DEVELOPMENT PATH

▶ 2017

The photovoltaic inverter "Migui" won the "Most Crafty Product Award of PV Field"

> ► 2021 The listing of "Sci-tech Innovation Board" opens a new phase of A+H

PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

# SOLUTIONS

### **Centralized Solutions for Large Power Plants**





### **String Solution for Large-scale Power Plants**





#### PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS 09/10

## **String Solution for Distributed Power Plants**





# **1500V Centralized PV Inverter** Ø & @



#### **Product features**



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New three-level topology with maximum efficiency greater than 99.07% Efficient MPPT control mode with tracking accuracy up to 99.9% 45 C 1.1 times long-term overload, 50 °C full load operation

Dynamic graphical LCD interface and parameter separation control technology provides perfect local configuration and management Intelligent fault recording Intelligent and locating Intelligent remote upgrading and maintenance management



DC 1500V reduces the system cost Support AC side parallel connection, dual winding transformer accessible Cost-saving Modular design saves operation and maintenance costs

Ô Reliable

Adapt to high altitude, high temperature, extreme cold and other complex and harsh environment Intelligent temperature control and fault detection to improve the system reliability PID repair to reduce component decay

#### **Technical Parameter**

Product model	tPower-NM4-2500K	tPower-NM4-3125K	
	DC-side parameters		
Max. open circuit voltage	1500VDC		
Max. DC current	2×1718A	2×2090A	
Number of input channels	16/18/20/24	16/18/20/24	
Number of MPPT	2	2	
Full load MPPT voltage range	800V~1300V	875V~1300V	
MPPT voltage tracking range	800V~1450V	875V~1450V	
Start Voltage	840V	915V	
MPPT efficiency	99.9%	99.9%	
	AC side peremeters		
	AC-side parameters		
Rated Power	2500kW	3125kW	
Maximum Power	2750kW	3437kW	
Maximum Output Current	2886A	3308A	
Rated power grid voltage	550V AC	600V AC	
Grid frequency range	45~50Hz/55~60Hz		
Rated Power Grid Frequency	50Hz/60Hz		
Power factor	>0.99 (full power)		
Power factor adjustment range	0.8 (leading) ~0.8 (lagging)		
Overall current waveform distortion ratio	<3% (ra	ated power)	
	System parameters		
Maximum efficiency (inverter)	99.07%	99.07%	
China efficiency (Inverter)	98.55%	98.55%	
High/low voltage ride through	Eq	uipped	
AC side parallel	Eq	uipped	
PID fix	Optional		
SVG	Optional		
Fault recording diagnosis	Equipped		
Online upgrade	Eq	uipped	
	Basic parameters		
Dimension (L×D×H)	2200×120	00×2200mm	
Weight	2700kg		
Protection degree	IP55		
Nighttime loss	<200W		
Cooling method	Intelligent air cooling		
Maximum working altitude	5000m (>3000m derating)		
Working environment temperature	-35°C~60°C		
Working environment humidity	0~95%, no condensing		
Display	LED		
Communication	RS485, Ethe	ernet (optional)	

#### PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS 13/14





#### **Technical Parameter**

Product model	TGN1500-2500ME	TGN1500-3000ME		
DC-side parameters				
Max. open circuit voltage	1500VDC			
Max. DC current	2×1718A	2×2090A		
Number of input channels	16/18/20/24	16/18/20/24		
Number of MPPT	2	2		
Full load MPPT voltage range	800V~1300V	875V~1300V		
MPPT voltage tracking range	800V~1450V	875V~1450V		
Start Voltage	840V	915V		
MPPT efficiency	99.9%	99.9%		
	AC-side parameters			
Rated Power	2500kW	3125kW		
Maximum Power	2750kW	3437kW		
Rated power grid voltage	10~37kV AC			
Grid frequency range	45~50Hz/55~60Hz			
Rated Power Grid Frequency	50Hz/60Hz			
Power factor	>0.99(full power)			
Power factor adjustment range	0.8 (leading) ~0.8 (lagging)			
Overall current waveform distortior ratio	<3% (rated power)			

#### **Product features**



	System parameters	
Maximum efficiency (inverter)	99.07%	99.07%
China efficiency (Inverter)	98.55%	98.56%
High/low voltage ride through	Equipped	
AC side parallel	Equipped	
PID fix	Optional	
SVG	Optional	
Fault recording diagnosis	Equipped	
Online upgrade	Equipped	
Basic parameters		
	Dasic parameters	
Dimension (L×D×H)	4300×2600×2	2500mm
Weight	12T	
Protection degree	IP55	
Transformer form	American edition/ Chinese edition/ European edition	
Cooling method	Intelligent air cooling	
Maximum working altitude	5000m (>3000m derating)	
Working environment temperature	-35 °C ~60 °C	
Working environment humidity	0~95%, Condensation free	
Display	LED	
Communication	RS485, Ethernet, fiber optic	ring network (optional)

#### 15/16 | PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

#### CRRC Intelligence Green Energy

# 320kW String PV Inverter



#### **Product features**

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Maximum efficiency 99%, China efficiency 98.6% 12/14/16-channel MPPT suitable for all types of application scenes The maximum current of single cluster is 20A, supporting 182/210 components Efficient Integrated PID protection and repair to improve system power generation

Cluster current detection and IV curve scanning ensure maintenance easier Power factor ±0.8 adjustable, full load power 0.9 or more, support night SVG function Intelligent AC/DC redundant power supply provides 24-hour status monitoring

**Technical Parameter** 



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S

IP66 protection level with standard secondary lightning protection

night SVG reduces the SVG investment of the power plant

Support the cluster with two to one access, saving DC cable cost

Support aluminum wire access, saving AC cable cost Support

45°C full load operation without derating, and high configuration without light loss DC arc detection and intelligent DC switch to cut off the fire hazard from the source

Cost-saving PLC carrier communication, reducing communication and

construction cost

Product model	tPower-NM6-320K	
DC-side parameters		
Max. open circuit voltage	1500VDC	
Rated input voltage	1080V	
Start Voltage	500V	
MPPT voltage range	500V~1500V	
Full load MPPT voltage range	850V~1300V	
Number of MPPT	12 (optional 14/16 channel)	
Maximum number of input strings per MPPT	2	
Max. input current	12*60 A(optional 14*60 A/16*60 A)	

#### **Technical Parameter**

Product model	tPower-NM6-320k
	AC-side parameters
Rated output power	320kW
Maximum Output Power:	352kW
Max. output apparent power	352KVA
Maximum Output Current	254 A
Rated power grid voltage	3 / PE, 800 V
Voltage range of power net (power grid)	680-880 V
Rated output frequency	50Hz/60 Hz
Power factor	>0.99
Power factor adjustment range	±0.8
Overall current waveform distortion ratio	<3%
	System parameters
Maximum efficiency	99%
China efficiency	98.6%
Island protection	Equipped
Surge protection	DC secondary/AC secondary
reverse DC protection	Equipped
DC input switch	Equipped
AC overcurrent protection	Equipped
Low voltage ride through	Equipped
Intelligent string detection	Equipped
DC arc pull detection	Optional
PID protection and repair	Optional
Nighttime reactive power compensation	Optional
	Basic parameters
Dimension (w×D×n)	1120×370×910mm
tereler:	115kg
Brotestian degree	I ransformeriess
Nighttime loop	IP66/ C5
	<5W
Cooling method	Intelligent air cooling
	5000m (>4000m)
	-30 C~60 C
Working environment humidity	0~100%
	RS485/PLC (optional)
DC side terminal	MC4 terminal
AC side terminal	OT terminal (max. 240mm <sup>2</sup> ,support aluminum wire access)
Grid Connection Standard	NB/T 32004-2018, GB/T 37408-2019
Safety/EMC standards	IEC 62109-1/-2, IEC 61000-6-2/-4, NB/T 32004-2018, GB/T 37408-2019

#### PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

# CSTP-2000 photovoltaic power plant monitoring system

The CSTP-2000 system can be configured flexibly according to the characteristics of different PV and power plants, and has the advantages of real, time Monitoring, intelligent early warning, five anti-lock operation, SOE sequence record, accident recall, Telecontrol service, power dispatch and energy management, historical data management, data statistics analysis, equipment management, protection and failure, information Management and other functions. The system has a user-friendly user interface, powerful analysis functions, and a complete fault alarm system to ensure the reliable and stable operation of the photovoltaics power system. large-scale ground photovoltaic power plants, distributed rooftop photovoltaic power plants, power plants, agricultural and solar complementary power plants, fishing and solar complementary power plants, and other monitoring requirements of different photovoltaic power plants

#### > Performance characteristics

- Modular multi-standard compatibility, expandable configuration, intelligent monitoring terminal
- It can monitor and control bus box, inverter unit, AC and DC power distribution unit, grid-connected transformer, meteorology instrument, sun tracking control system and other equipment in real time
- Support users to query real-time/history data and alarm, Browse realtime/history data curve, bar chart, pie chart, accident recollection, event record

#### Technical Parameter

Product model	CSTP-2000
Items	Parameter
working voltage	220VAC
DC output voltage	DC12V/DC24V
communication interface	RS232, RS485, RS422, Ethernet cable, Fiber Ethernet
letter of agreement	Supports conventional communication protocols such as IEC 60870-5-101/102/103/104, DNP3.0, CDT, MODBUS RTU, SC1801
real-time	Scanning period: digital 50ms, analog 100ms
precision	AI error: ±0.1%F.S. AO error: ±0.15%F.S. Time sequence recording (SOE) time resolution: 1ms
reliability	MTBF: ≥100000h MTTR: ≤10min System availability: ≥99.95%
working temperature	-20~55
Working humidity	5~95%



- Support the user "Remote control", "Remote control" operation, using "Two seats" control mode
- > Support Kenbu, Golden Sun Data Center remote interface access
- Sun Data Center remote interface access to support different levels of users with different permissions to log on to
- support energy-saving emission reduction displays, such as CO2, SO2 emission reduction, etc.

# CSTP-Cloud photovoltaic power station intelligent operation and maintenance platform

CSTP-Cloud is an intelligent operation and maintenance operation platform for photovoltaic power plants. It has functions such as power station monitoring, fault diagnosis, operation and maintenance management, and performance management. It uses cloud platform big data analysis and advanced intelligent control technology to realize intelligent management of power stations. Help users discover potential defects of power plants in time, reduce power generation losses, improve operation and maintenance efficiency, and enhance the value of power plants.



#### > Technical Parameter

Product model	
Cloud monitoring	
Access method	
access method	
Cloud monitoring	
Alarm mode	
Recording analysis	
fault location	
Deficiency processing	Autor
Maintenance guidance	Three-dimensional d
performance management	
Indicator management	Multi-dimensional comparativ power station, the equivalent ti
Strategic analysis	Power station inde
Power analysis	Radiation-power ( operation and ma
Power station analysis	Load power
Equipment Analysis	Inverter and module ef environment
cleaning analysis	Component dus
data storage	
Power station capacity	
data refresh	

System reliability

#### 23/24 | PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS

#### CSTP-Cloud

GPRS, 4G, 5G, Wifi, wired broadband Computer Client, Web Browser, Mobile APP

Email, SMS, Mobile APP

CSR\_Drive expert online diagnosis

String-level fault intelligent location

matically push multiple sets of defect elimination solutions

dynamic operation model, all-round guidance for equipment troubleshooting

ve analysis of key indicators such as the planned completion rate of each time of online electricity, comprehensive efficiency and resource distribution

ex scientific evaluation system, multi-latitude decision analysis model

generation analysis, power generation and online power analysis,

intenance cost and benefit analysis, power indicator analysis, etc.

curve analysis, power station performance analysis,

generation loss analysis, fault statistical analysis, etc.

fficiency analysis, string current analysis, inverter comparison analysis, tal monitoring analysis, equipment performance analysis, etc.

t accumulation model analysis, weather forecast model analysis,

cleaning cost and cleaning benefit analysis

>30 years >100GW

<1min

>99.99%

PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS





Service network covers the whole world



Dedicated supply guarantee strategy services







## 27/28 | PHOTOVOLTAIC INVERTER PRODUCTS AND SYSTEM SOLUTIONS



#### "TUV" Certification