TRC ADVANCED TECHNOLOGIES INC.

HDsolar

SMART CREATES GREEN FUTURE

Safety Expert In Solar Structure

TRC Advanced Technologies, Inc.
Hangzhou Huading New Energy Co., Ltd.

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TRC & HDsolar

TRC Advanced Technologies, Inc.

TRC is a privately held Company that was founded in Europe in 1996, and quickly became a leader in the wireless communication arena with a focus on Mobile Asset Management Systems. TRC's expertise in telecommunications was a natural complement in the new division, which was formed in 1997 to pursue the engineering, design and integration of SCADA Systems in the region. In 2000, TRC Houston was established to pursue the international SCADA opportunities and serve the SCADA needs of the energy capital of the world. At the present, TRC has developed joint ventures in Algeria, Pakistan, Indonesia and China to serve as satellite operations for our SCADA Projects in the region. Since year 2018, to expand the business to the fast growing clean energy sector, the company has worked closely with HDsolar , a leading clean energy technology and solution provider, to become a system and equipment provider for the photovoltaic business. Both parties seek to form a partnership to achieve the great goal of global carbon neutrality, and photovoltaic system solution services will become another important business of TRC in the future.

Hangzhou Huading New Energy Co., Ltd.

HDsolar was established in 2009 as a leading supplier of PV mounting and tracking system for utility, commercial, industrial and residential projects worldwide. The headquarter of HDsolar is located in Hangzhou,and the factories are located in Zhejiang and Hebei Province, with 6000MW annual production capacity. As of Year 2020, HDsolar has contributed to 500 solar photovoltaics power stations across 30 countries in different continents for 10GW of solar mounting system solution. HDsolar will continue to be your safety expert in solar mounting solution and provide green energy to the world .

Business Scope

01

Solar mounting structure solution

Safety expert in solar mounting structure

TRC & HDsolar innovates customized mounting system solutions to bring customers higher power plant revenue. Our products are widely used in large and medium-sized ground PV power plants, sand/agriculture/fishery complementary ground power plants, industrial and commercial rooftop PV power plants, residential rooftop PV systems and PV carports.

- Desert solar PV station
- Agriculture solar PV station
- Fishing solar PV station
- Mountain PV station
- Large and medium ground PV station
- Distributed rooftop PV station
- Household rooftop PV station

02

One-stop photovoltaic power station EPC service

one-stop photovoltaic power station solutions

TRC & HDsolar is committed to providing one-stop solar power station solutions for industrial and commercial parks, public institutions etc, including survey, design, procurement, construction, grid connection, defect elimination with the life cycle engineering services. The company has set up overseas branches in Malaysia and Vietnam to provide customized solutions for global customers. At present, the company has completed a number of megawatt projects in Southeast Asia, South America, Eastern Europe, Japan and other regions, highly appreciated and recognized by global customers.

- Project consulting
- Preliminary survey
- Engineering design
- System analysis
- Engineering procurement
- Professional construction
- Debugging& Grid-connected
- Operation& Maintenance

Industrial Strength

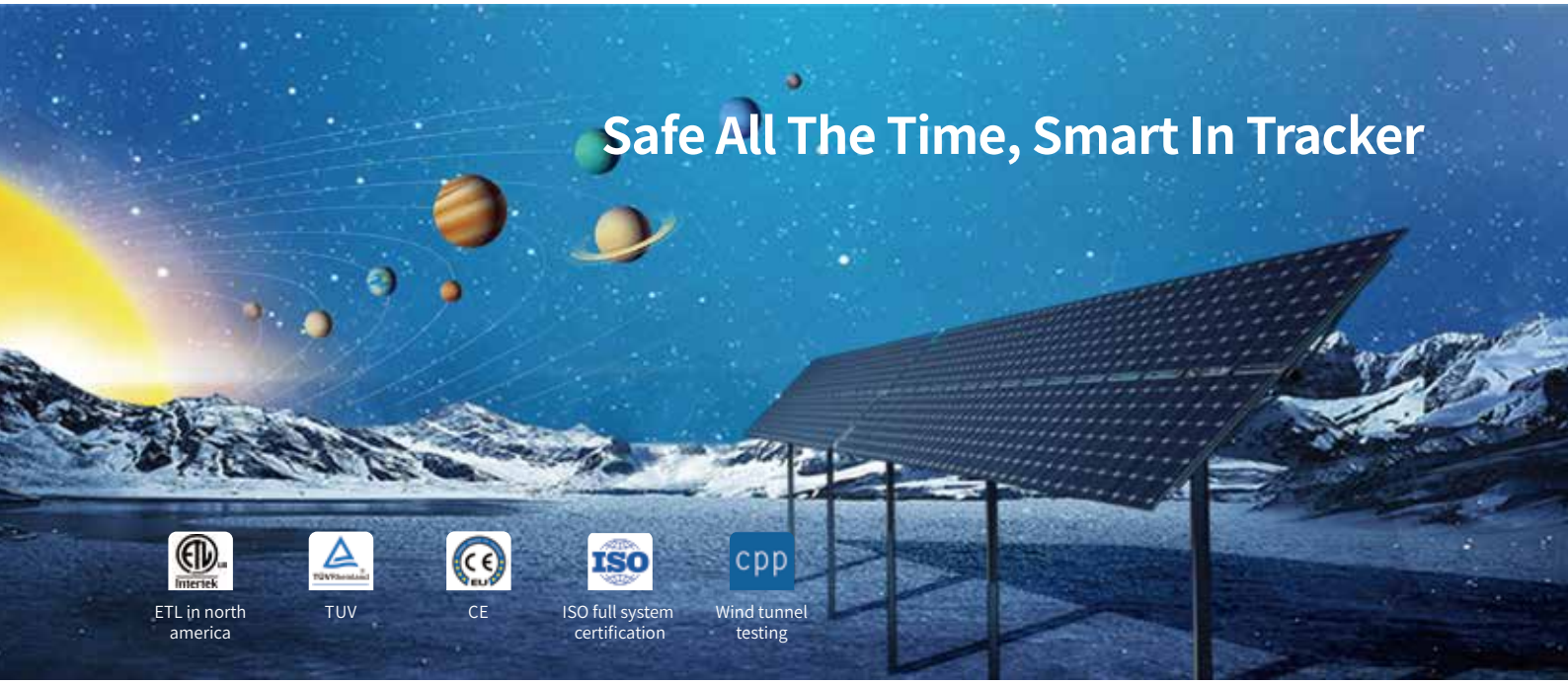
Safety expert in solar mounting structure

As a factory of TRC,HDsolar focused on solar mounting structure for 11 years.TRC & HDsolar has taken safety as top most priority and form, "safe" closed-loop management from product development,design, production to installation.

R & D Team

Continuous innovation, coordinated for development

The team has more than 50 personnel with high prefessional title and 122 patents. TRC & HDsolar has developed the planetary series tracker indenpendently, owned the core intellectual property rights in control, drive, intelligent tracking algorithm. The product ensures the safe and stable operation of solar station in the whole life cycle, adapts to various complex application scenarios, and helps to reduce cost and increase efficiency.



We have established extensive technical exchanges and cooperation with domestic scientific research institutes, and with well -known solar module manufacturers to explore the optimal system solutions.

Global Layout

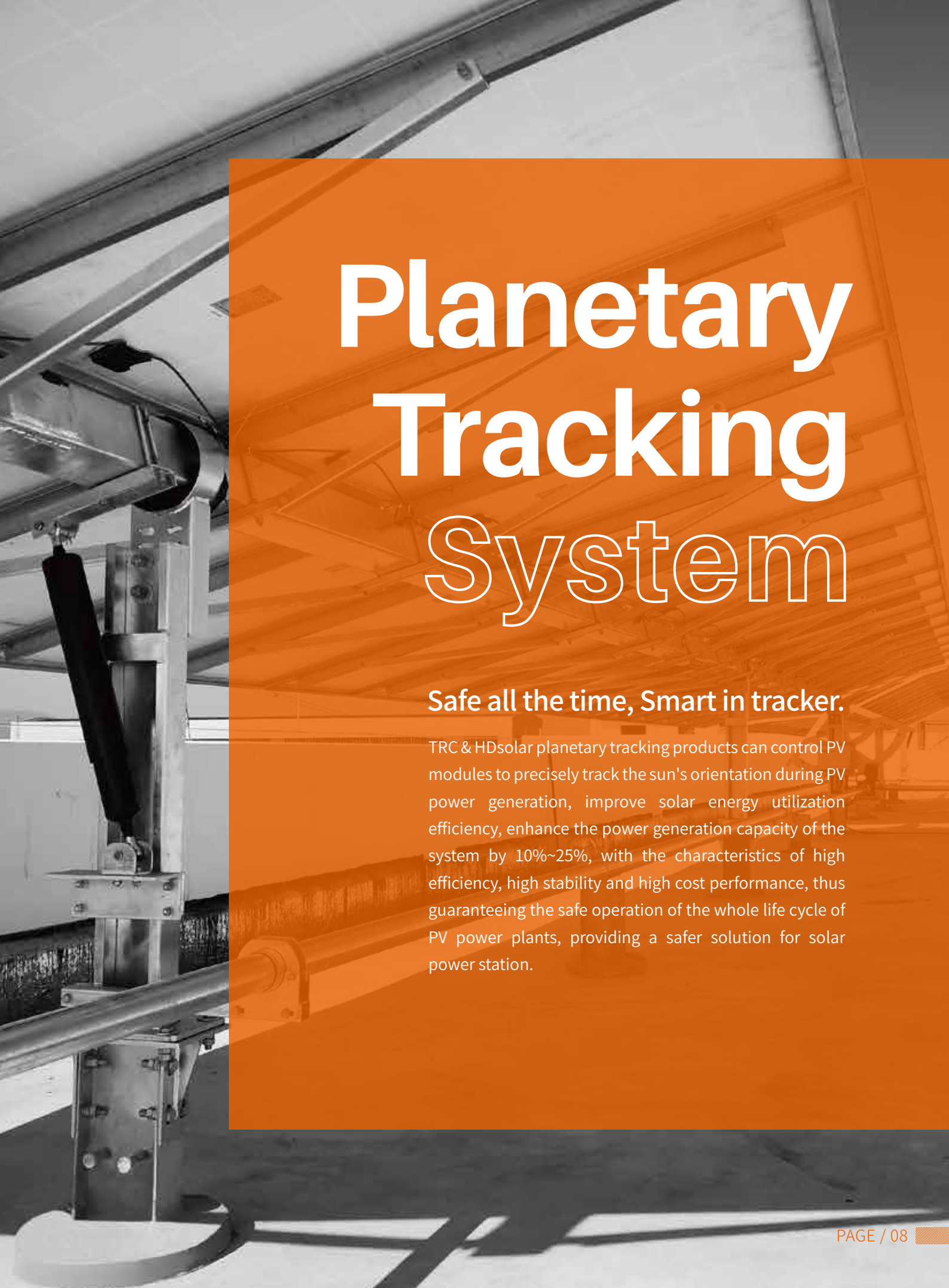
Based in china, across the world

The product sales footprint covers more than 30 countries on four continents in Asia, Europe, America and Africa, with 10 GW of installed capacity. We had established a long-term strategic partnership with many well-known enterprises and has carried out in-depth cooperation with customers worldwide.

Partnership

Win-win cooperation

Established a long-term strategic partnership with many well-known enterprises and has carried out in-depth cooperation with customers worldwide.



Planetary Tracking System

Safe all the time, Smart in tracker.

TRC & HDsolar planetary tracking products can control PV modules to precisely track the sun's orientation during PV power generation, improve solar energy utilization efficiency, enhance the power generation capacity of the system by 10%~25%, with the characteristics of high efficiency, high stability and high cost performance, thus guaranteeing the safe operation of the whole life cycle of PV power plants, providing a safer solution for solar power station.

Mercury 2 Tracker

Multi-point Rotary Single Row Independent Driving Tracker

Multi-point drive security upgrade

01 More secure with multipoint driving structure.

02 High reliability mechanical linkage device.

03 Fewer piles.

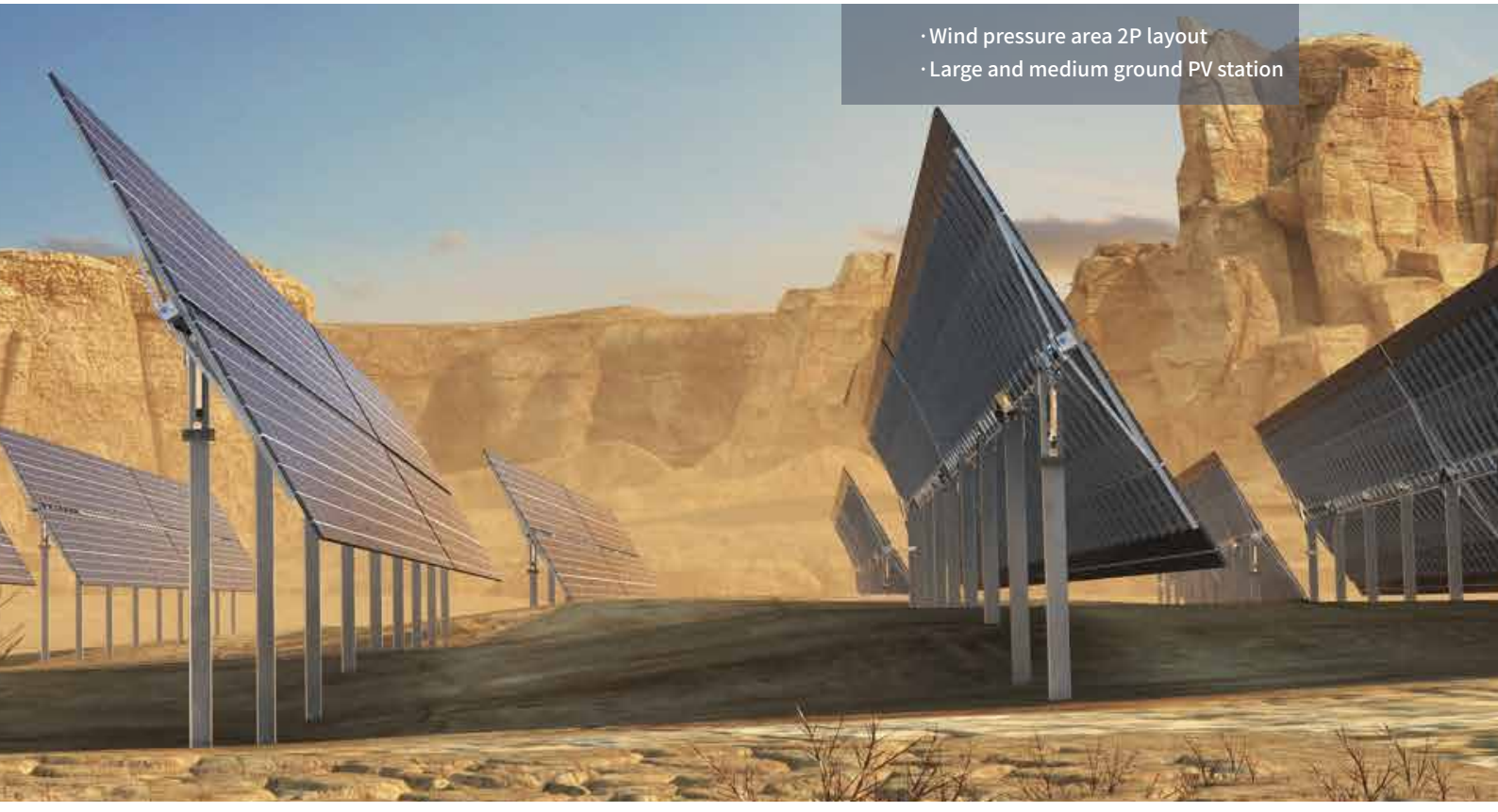
04 DC string self powered, with backup battery.

05 Accurate astronomical algorithm, active tracking and closed-loop feedback control operation.

06 The control and driving device has high protection and stability adapted to the harsh environment.

07 Wireless communication device with high reliability.

Basic parameters			
Product type	Single row independent drive tracker	Driving mechanism	Multi point rotary reducer mechanical linkage
Tracking range	-60°~+60°	Slope range	N-S:5°/ E-W:Unlimited
Wind-resistant design	⩽45m/s	Gale protection	18m/s
Main structural material	Q235B/Q355B/Q450	Zinc coating thickness	⩾65μm
Pile foundation form	PHC pipe pile/driven pile/ cast-in-place pile	Land use rate（GCR）	⩾30%
Module and layout			
Module Type	182/210mm	Ground Clearance(Min)	0.3m
Layout of Module	2P	Module Quantity	⩽120pcs
Automatic control			
Tracking mode	Astronomical algorithm / active tracking / anti shadow tracking	Tracking accuracy	⩽2°
Control mode	Closed loop feedback control	Control accuracy	⩽0.3°
Power supply mode	Self-powered under below 1500V DC	Spare battery	Lithium battery, ⩾6Ah
Controller	MCU	Working environment temperature	-25°C~+60°C
Communication mode	Zigbee wireless communication	Weather protection	Gale/snow/hail
Warranty			
Structure	10 years	Transmission and automation control	5 years



· Wind pressure area 2P layout
· Large and medium ground PV station

Mercury 1 Tracker

Single Point Rotary Single Row Independent Driving Tracker

Safe, stable, efficient and flexible

01 Flexible layout, the best choice of narrow and irregular terrain.

02 Unobstructed row to row channel, convenient passage for maintenance and operation.

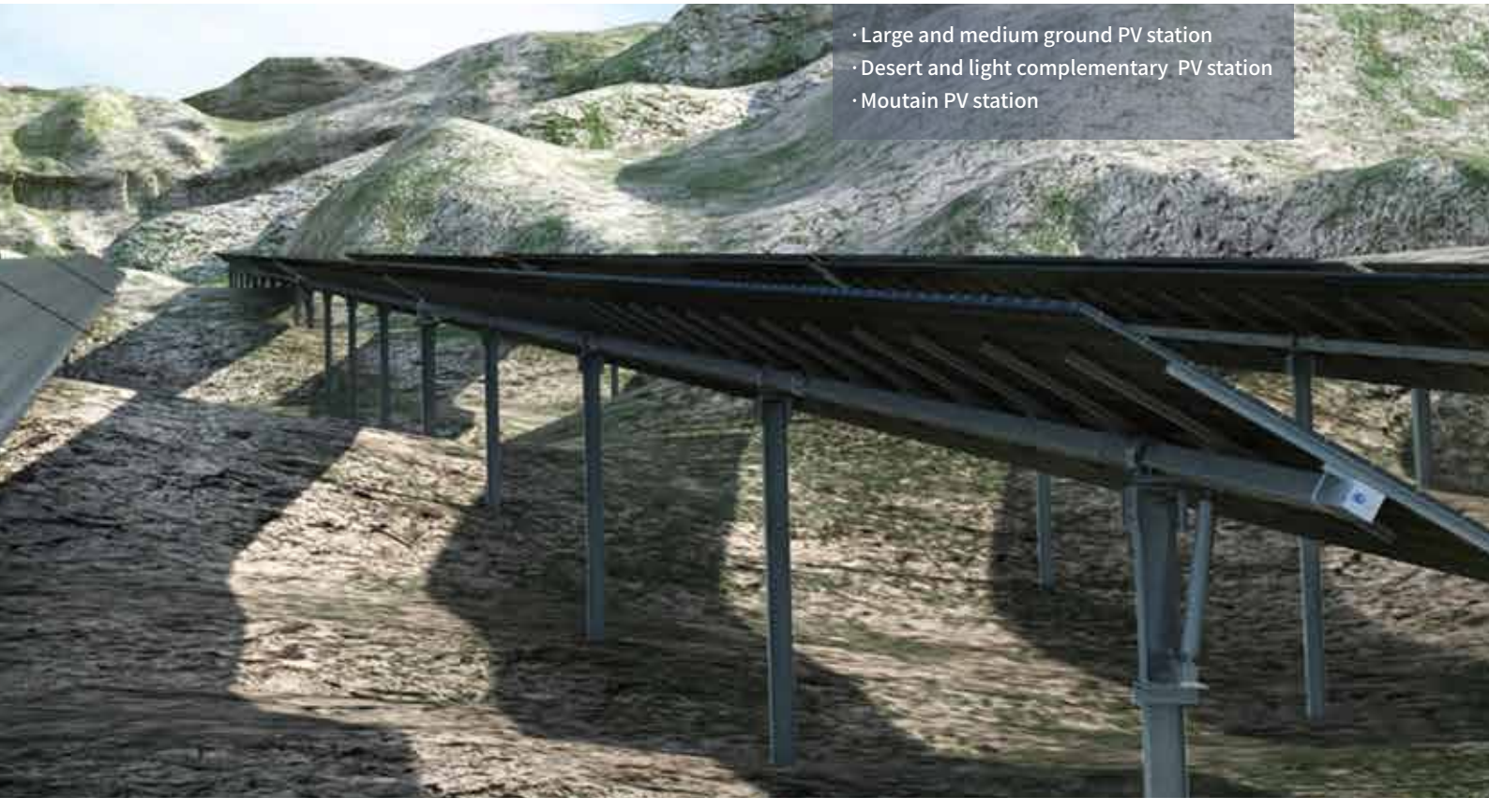
03 DC string self powered, with backup battery.

04 Accurate astronomical algorithm, active tracking and closed-loop feedback control operation.

05 The control and driving device has high protection and stability adapted to the harsh environment.

06 Wireless communication device with high reliability.

Basic parameters			
Product type	Single row independent drive tracker	Driving mechanism	Single point rotary reducer
Tracking range	-60°~+60°	Slope range	N-S：5°/ E-W：Unlimited
Wind-resistant design	⩽38m/s	Gale protection	18m/s
Main structural material	Q235B/Q355B/Q450	Zinc coating thickness	⩾65μm
Pile foundation form	PHC pipe pile/driven pile/ cast-in-place pile	Land use rate（GCR）	⩾30%
Module and layout			
Module Type	182/210mm	Ground Clearance(Min)	0.3m
Layout of Module	1P/2P	Module Quantity	1V:⩽80pcs/2V:⩽60pcs
Automatic control			
Tracking mode	Astronomical algorithm / active tracking / anti shadow tracking	Tracking accuracy	⩽2°
Control mode	Closed loop feedback control	Control accuracy	⩽0.3°
Power supply mode	Self-powered under below 1500V DC	Spare battery	Lithium battery, ⩾6Ah
Controller	MCU	Working environment temperature	-25°C~+60°C
Communication mode	Zigbee wireless communication	Weather protection	Gale/snow/hail
Warranty			
Structure	10 years	Transmission and automation control	5 years



Mars Tracker

Sprocket Single Row Independent Drive Tracker

Safe and reliable at low cost avaitable in harsh terrain

01 Can be flexibly arranged ,with no terrain limitation.

02 Clear passage between rows.

03 Cost less on power station construction, no external power cable wiring.

04 Wireless communication device with higher reliability.

05 Accurate astronomical algorithm active tracking and closed-loop feedback control operation.

06 Overall high protection compatible with outdoor complex environment.

07 Impeccable evasive and protect system under extreme weather.

Basic parameters			
Product type	Single row independent drive tracker	Driving mechanism	Chain wheel
Tracking range	-60°~+60°	Slope range	N-S:5°/ E-W:Unlimited
Wind-resistant design	⩽38m/s	Gale protection	18m/s
Main structural material	Q235B/Q355B/Q450	Zinc coating thickness	⩾65μm
Pile foundation form	PHC pipe pile/driven pile/ cast-in-place pile	Land use rate（GCR）	⩾30%
Module and layout			
Module Type	182/210mm	Ground Clearance(Min)	0.3m
Layout of Module	1P/2P	Module Quantity	1V:⩽80pcs/2V:⩽60pcs
Automatic control			
Tracking mode	Astronomical algorithm / active tracking / anti shadow tracking	Tracking accuracy	⩽2°
Control mode	Closed loop feedback control	Control accuracy	⩽0.3°
Power supply mode	Self-powered under below 1500V DC	Backup battery	Lithium battery, ⩾6Ah
Controller	MCU	Working environment temperature	-25°C~+60°C
Communication mode	Zigbee wireless communication	Weather protection	Gale/snow/hail
Warranty			
Structure	10 years	Transmission and automation control	5 years

Saturn Tracker

Chain Wheel Multi Row Linkage Tracker

Customized in agriculture/fishery area high density, high cost performance

01 Good slope adaptability, which can adapt to continuous undulating terrain in E-W direction of photovoltaic power station;

02 Multi row linkage operation reduce the investment cost and operation & maintenance cost;

03 The ultra wide row spacing does not affect the daylighting demand of farmland and water surface;

04 The height of the lowest point can reach more than 2.5m, and conventional agricultural machinery can operate normally;

05 The driving mechanism and support share the same pile foundation, which reduces the investment cost and the impact on land planting / breeding area.

Basic parameters			
Product type	Multi row linkage	Driving mechanism	Chain wheel
Tracking range	-60°~+60°	Slope range	N-S:5°/ E-W:20°
Wind-resistant design	⩽38m/s	Gale protection	18m/s
Main structural material	Q235B/Q355B/Q450	Zinc coating thickness	⩾65μm
Pile foundation form	PHC pipe pile/driven pile/ cast-in-place pile	Land use rate（GCR）	⩾30%
Module and layout			
Module Type	182/210mm	Ground Clearance(Min)	0.3~2.5m
Layout of Module	1P/2P	Module Quantity	800pcs
Automatic control			
Tracking mode	Astronomical algorithm / active tracking / anti shadow tracking	Tracking accuracy	⩽2°
Control mode	Closed loop feedback control	Control accuracy	⩽0.3°
Power supply mode	AC power supply	Power consumption	1.2kWh/day
Controller	PLC	Working environment temperature	-25°C~+60°C
Communication mode	Zigbee wireless communication	Weather protection	Gale/snow/hail
Warranty			
Structure	10 years	Transmission and automation control	5 years

Ground Fixed Mounting System

Aluminum Mounting Structure

The ground aluminum mounting structure is suitable for various application scenarios and various modules installation requirements. The unique non-clamp beam design and high pre-installation structure can provide installation efficiency and reduce installation error, saving time and construction cost for project.

Features

01 Easy installation

02 High corrosion resistance

03 Wide range of application

04 High compatibility

05 Less construction error

Galvanized Steel Mounting Structure

This galvanized carbon steel ground mounting system is suitable for shallow beach, grassland, Gobi, wetland and other geological environment. The material is hot-dip galvanized steel, which has good mechanical properties and foundation bearing capacity. It can be used in C-shaped steel pile, H-shaped steel, pile screw pile, concrete pile and other foundations.

Features

01 Green

02 High corrosion resistance

03 Good mechanical properties

04 Wide application

05 High installation efficiency

The Foundation Forms

01

Ground mounting system-screw pile

02

Ground mounting system-concrete foundation

03

C-type steel pile foundation carbon steel ground mounting system

04

H-type steel pile foundation carbon steel ground mounting system

Agricultural Solar Mounting System

The system structure is based on the module layout , sunshine required by crops and agricultural machinery size. It combines solar power generation, modern agricultural planting / breeding and efficient agricultural facilities to form an efficient ecological agriculture mode.

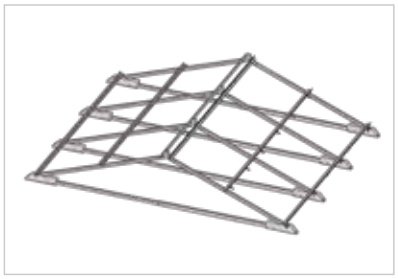
Perfect combination of photovoltaic power generation and modern agriculture.

Features

01 High corrosion resistance
02 High space utilization
03 The high utilization of land
04 Long span to adapt to complex terrain
05 Quick installtion design without welding
06 Long service life

Foldable PV Mounting System

The utility model foldable mounting system, with the entire system as a unit, links the components together for unparalleled ease of transport and installation and use.



Features

01 The foldable photovoltaic support structure of the utility model comprises a container and a photovoltaic support module, which is composed of a plurality of foldable support units.

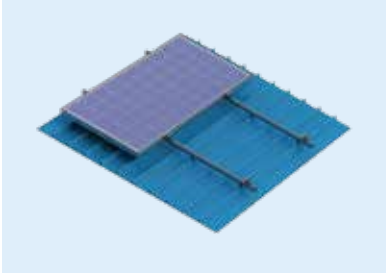
02 The foldable support system can be moved at any time according to the power consumption, and can be rapidly unfolded or folded for easy movement and transportation.

03 Replacing the original photovoltaic mounting guide rail, using the structure of hinge and connecting rod to connect the upper and lower components, saving materials and reducing costs.

Solar Rooftop Mounting

Metal Roof System

The metal roof system is a universal solar panel installation system for inclined roof and flat roof. Innovative rail and clamp connection technology, so that it does not need on-site processing, installation is fast and convenient, and can be optimized according to the actual roof environment.

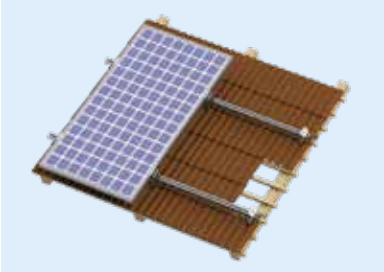


Features

01 High versatility
02 Stable and reliable
03 Long service life
04 Wide application
05 High installation efficiency

Tile Roof System

The tile roof installation system can be optimized according to different tile shapes such as S-shaped tile, fish scale tile, slate tile and other roof structures. The installation is fast and convenient, with high efficiency and short construction period.



Features

01 High versatility

02 Stable and reliable

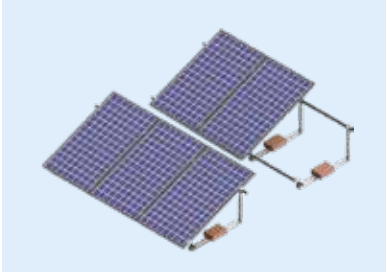
03 Long service life

04 Wide application

05 High installation efficiency

Ballast Roof System

The ballast roof installation system is made of light and high- strength aluminum alloy parts, which will be highly pre installed and prepared in the factory, and then delivered to the installation site, so as to ensure the structural stability and save the installation cost.



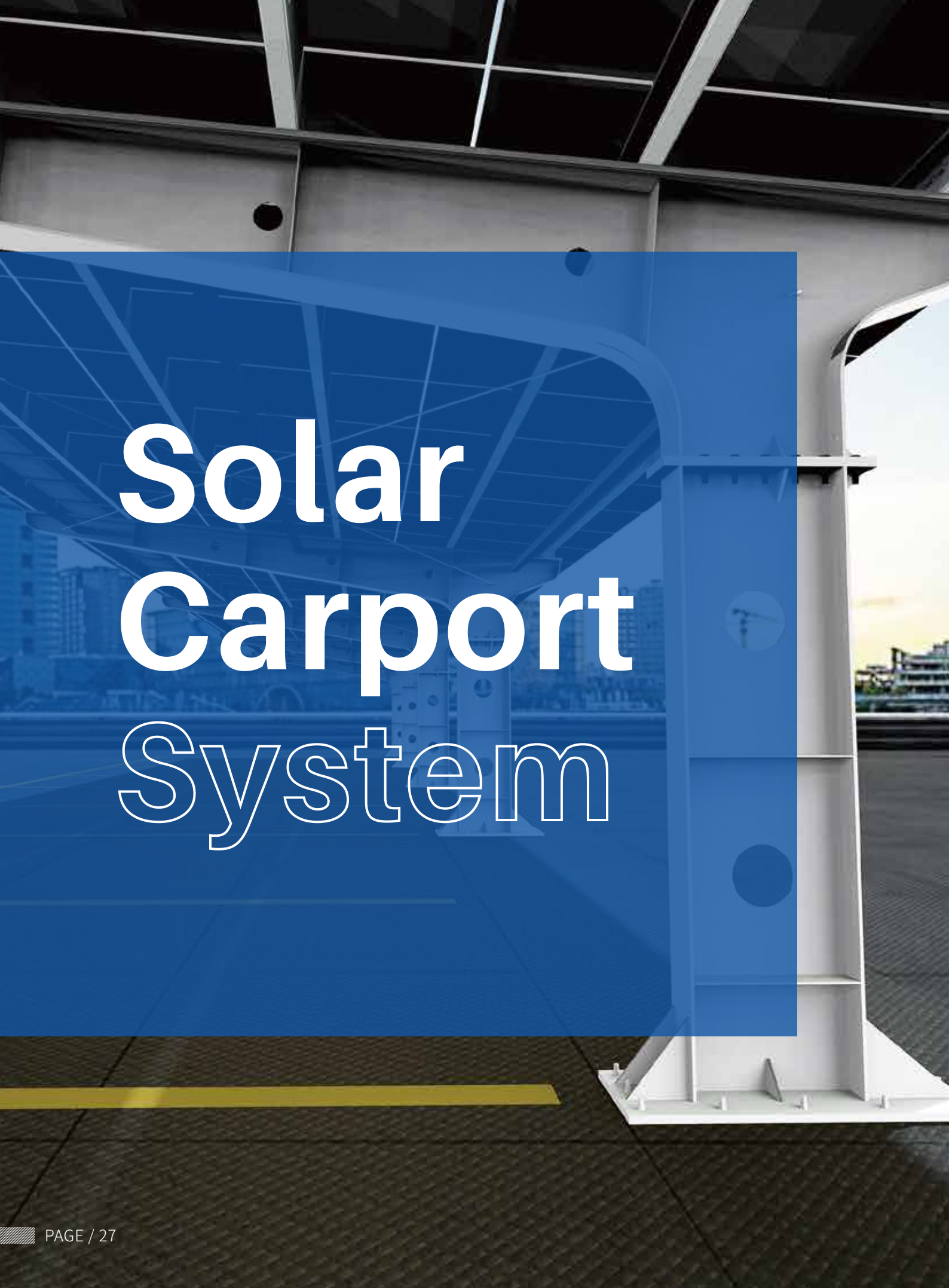
Features

01 Light weight and high strength

02 Stable and reliable

03 Highly pre installed

04 Competitive in performance & cost



Solar Carport System

Solar Carport System

- It can bring continuous green power generation income for owners, with energy saving and emission reduction.
- High strength light aluminum alloy and steel structure material, professional industrial design, beautiful, simple, generous, create a new image of sunshine travel.

Features

Waterproof design

Good waterproof performance with structural waterproof design.

Easy installation

System modularization design Easy to install Cost reduction.

Reliable and durable

Reliable and durable aluminum alloy, stainless steel material Surface hot dip galvanizing process Excellent corrosion resistance.

Stability and safety

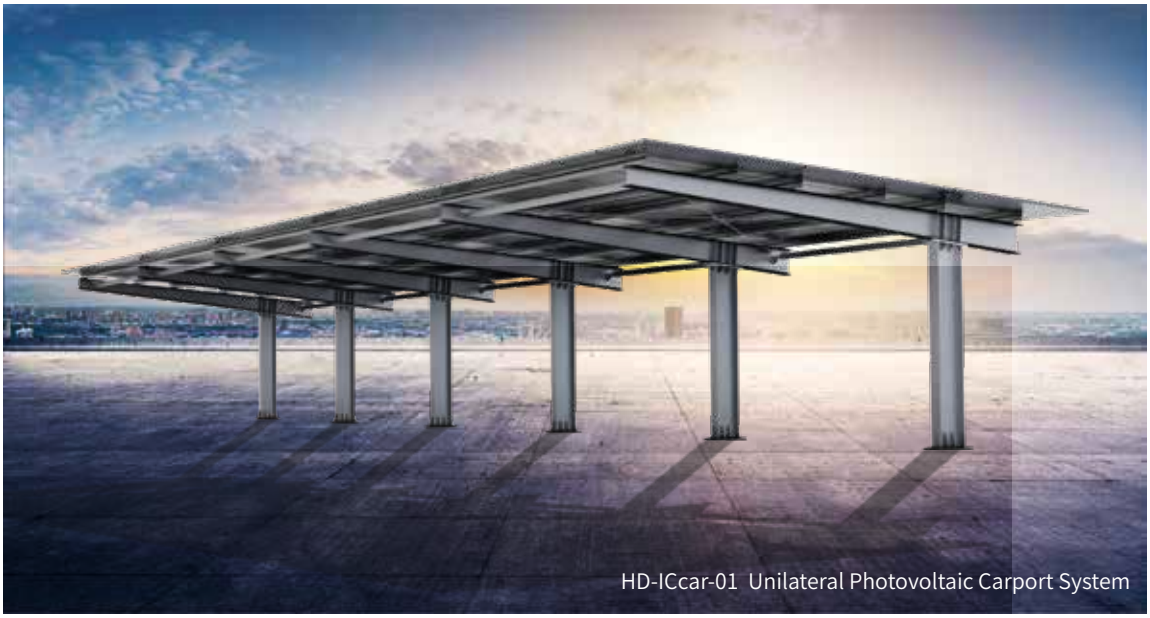
Professional mechanics calculation Special software pre simulated operation.

Wide application

Factory park, business park, parking lot Campus, hospital, residential area……

Modeling diversity

Various styles to meet the personalized requirements.


HD-ICcar-01 Unilateral Photovoltaic Carport System

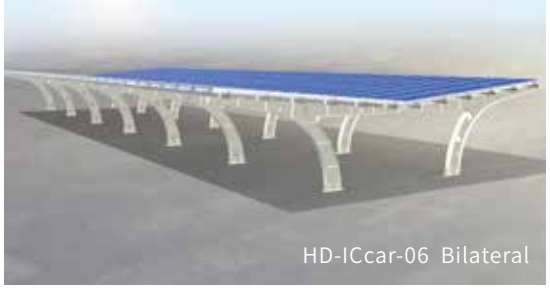

HD-ICcar-02


HD-ICcar-03

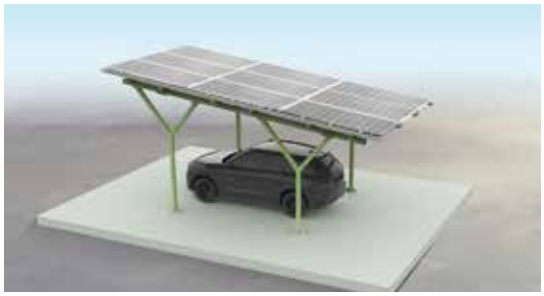

HD-ICcar-04 N TYPE


HD-ICcar-05 Bilateral

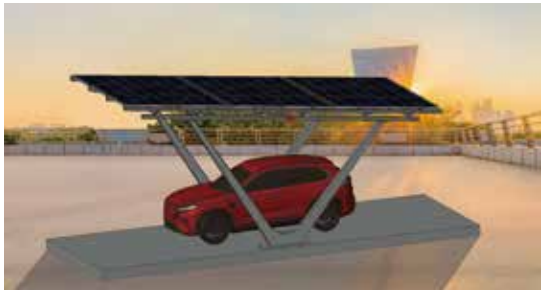
- Large space
- Low cost
- Lightweight and easy installation


HD-ICcar-06 Bilateral

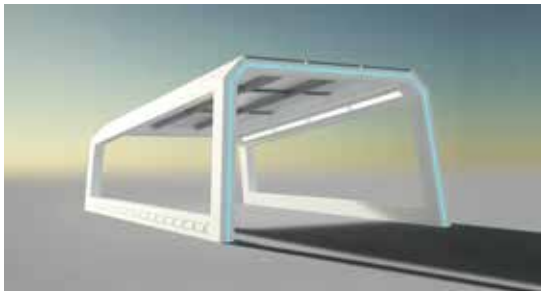
HD-Hcar-01



HD-Hcar-02

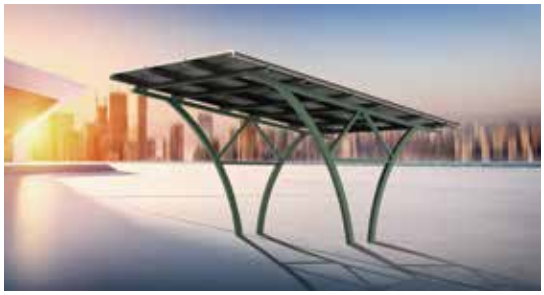


HD-Hcar-03



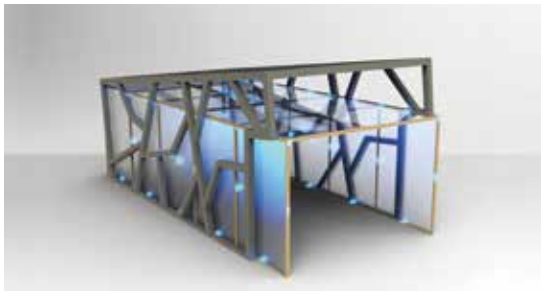
HD-Hcar-04

HD-Hcar-05



HD-Hcar-06

HD-Hcar-07



HD-Hcar-08

TYPICAL CASE

TYPICAL CASE

253MW

Project name: Vietnam Dau Tieng 500MW
Supply scale: 253MW (the largest project mounting structure supplier)
Mounting structure type: Ground carbon steel
Project date: July 1, 2018

160MW

Project name: Guizhou Jinyuan Weining solar station
Supply scale: 160MW
Project type: Agriculture and light complementary PV station

114MW

Project name: 114MW solar station in Ukraine
Mounting structure type: Ground mounting system
Project date: Jan 2019

100MW

Project name: Hebei Nangong 100MW project
Supply scale: 100MW
Project type: Agriculture and light complementary PV station

100MW

Project name: Tang Zheng Shandong Dongying Tangzheng 100MW fishery complementary solar station
Supply scale: 100MW
Project type: Fishing light complementary PV station

100MW

Project name: Gansu Yongchang 100MW project
Supply scale: 100MW
Project type: Desert Solar Project

73MW

Project name: Tình Khánh Hòa Long Son 170MW project in Vietnam
Project scale: 73MW
Mounting structure type: Ground mounting syetem
Project date: September 4, 2020

50MW

Project name: Dohwa Quang Binh 50MW project
Mounting structure type: Ground mounting system
Project date: June 2020

50MW

Project name: 50MW solar station in Nha Trang Vietnam
Bracket type: Ground mounting system
Project date: Nov 2018

50MW

Project name: 50MW solar station in Tỉnh Bình Định Vietnam
Bracket type: Ground mounting system
Project date: 2018.9.12

45MW

Project name: 45MW Solar Station in Malaysia
Mounting structure type: Ground mounting system
Project date: Sep 15, 2019

21MW

Project name: Hokkaido project in Japan
Bracket type: Ground mounting system
Project date: Apr 2019

7.6MW

Project name: 7.6MW solar station in Romblon Philippines
Supply scale: 7.6MW
Bracket type: Ground mounting system
Project date: June 2018

3.8MW

Project address: Taizhou,Zhejiang
Bracket type: Solar carport

2.24MW

Project address: Nepal
Bracket type: Ground mounting system

2MW

Project address: Long An Vietnam
Bracket type: Aluminum alloy+carbon steel rooftop mounting

1.02MW

roject address: Mexico
Bracket type: Ground mounting system

316.8KW

Project address: Ghana West Africa
Bracket type: Ground folding PV mounting system

700KW

Project address: Vietnam HCMC
Bracket type: Aluminum alloy roof bracket

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