

#### PowerTracker, Since2011







To increase energy yield of solar farm,
Powerway has strived researching and developing since 2011,
Above pictures are the early product of PowerTracker

#### **PowerTracker 3 Major Products**

#### **PowerLink**

Centralized System -Universal Coupling



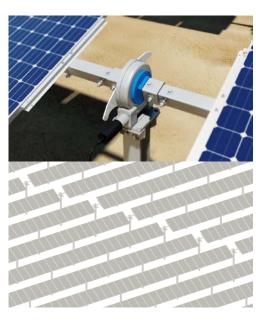
#### **PowerMax**

Centralized System -Linear Actuator



#### **PowerFit**

Distributed System





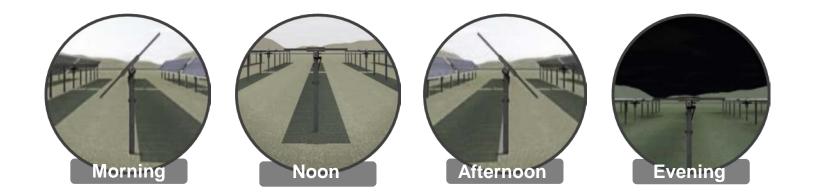






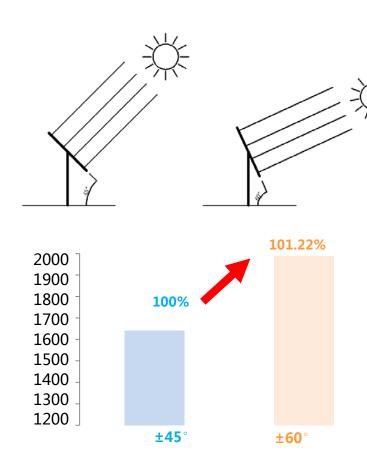
## Advantages





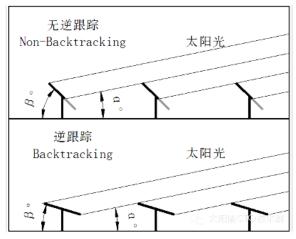
- Smart Tracking guarantees 10%~25% generation increase
- •±60° large angle tracking produces 1-2% more generation than regular tracker

#### High Return ±60°Tracking Range=Generation Increase



## ±60° GENERATION INCREASE 1.22%!!

Туре	Common Model $\pm$ 45 $^{\circ}$	PowerMax $\pm 60^\circ$	
Capacity (DC)	3MW	3MW	
Module No. Per Pow	40	40	
Capacity Per Array	250kW	250kW	
Generation Per Year	1964KWh/KWp/year	1988KWh/KWp/year	
Generation Increase Rate		1.22%	

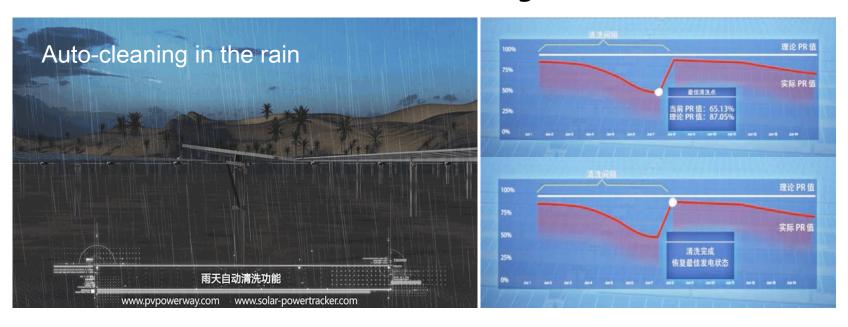




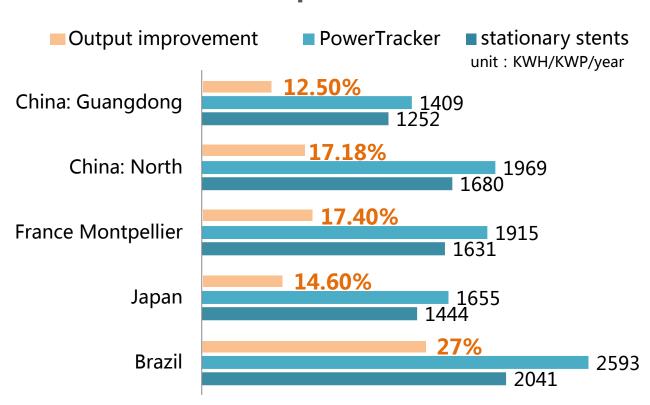
# Backtracking=Generation Increase BACKTRACKING GENERATION INCREASE 2.37%!!

Туре	Common Model-Without	PowerMax-With	
Capacity (DC)	3MW	3MW	
Module No. Per Pow	40	40	
Capacity Per Array	250	250	
Generation Per Year	1942KWh/KWp/year	1988KWh/KWp/year	
Generation Increase Rate		2.37%	

#### **Auto-Cleaning=Generation Increase!**



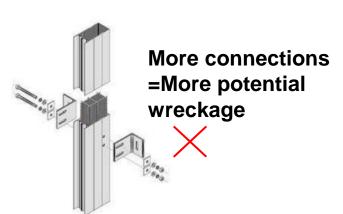
#### **Generation Comparison at Different Sites**



## **Easy Installation**



## Easy piling, only need to ram it





Fast Piling

Ramming it to finish it !!



More bots
=
More labor costs

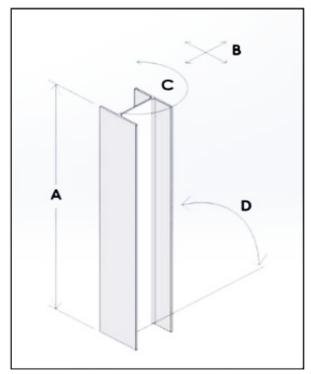


## **Easy Work On Site-High Flexibility**

N-S Tilt Degree-D: 1.5°; Tilt Degree-C: 2°;

Vertical Tolerance-A :  $\pm$  25mm; Horizontal Tolerance-B:  $\pm$  15mm.





## **Easy Installation-Work simply**

- 1. Single worker required
- 2. No welding
- 3. Fasteners easily assembled



## **Easy Work On Site-Say No To Heavy Equipment**





## **WORK BY HAND**

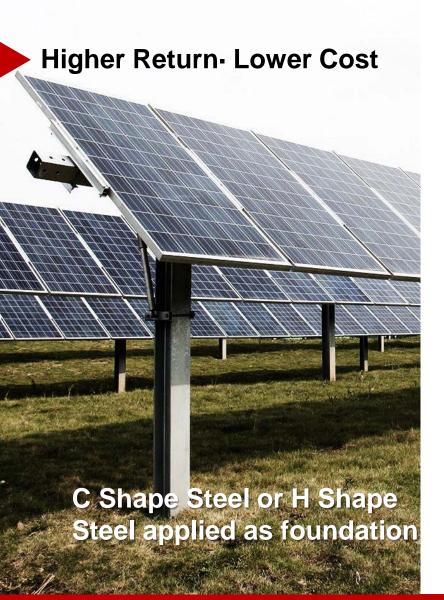


## **Easy Installation-Work in bulk**



More connections
=More potential
wreckage





Balanced Design Saves

25%~35% Foundation!



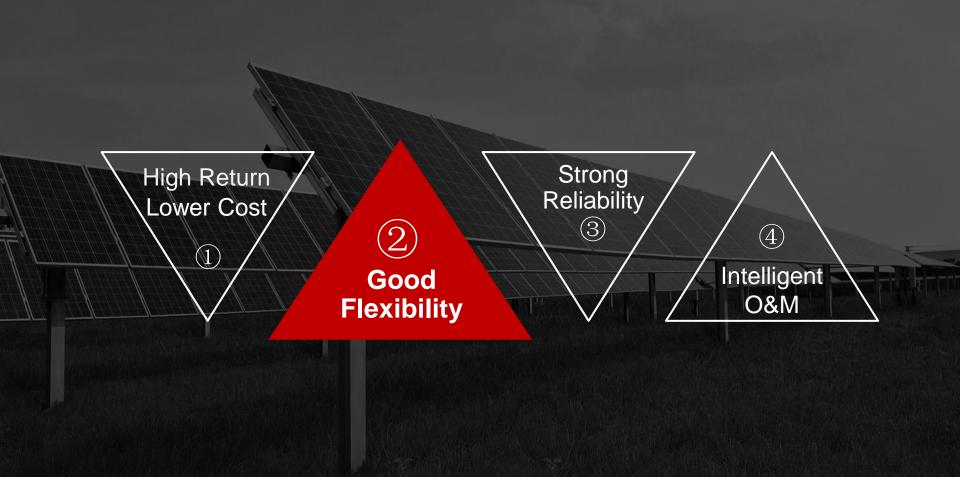




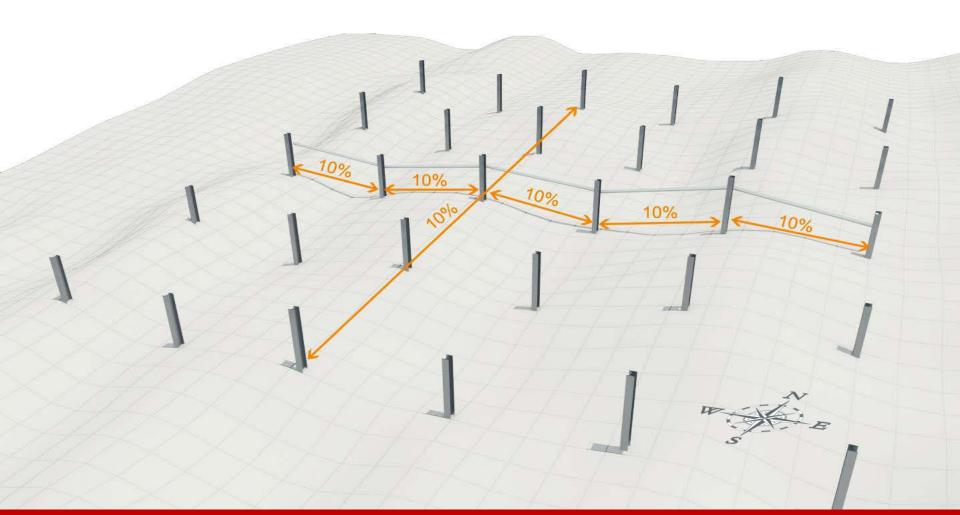
#### Per 100MW:

- Saves 10,000 foundations approximately
- Saves 900 tons of steel or aluminum approximately
- Saves 2 US cents installation cost per Watt approximately

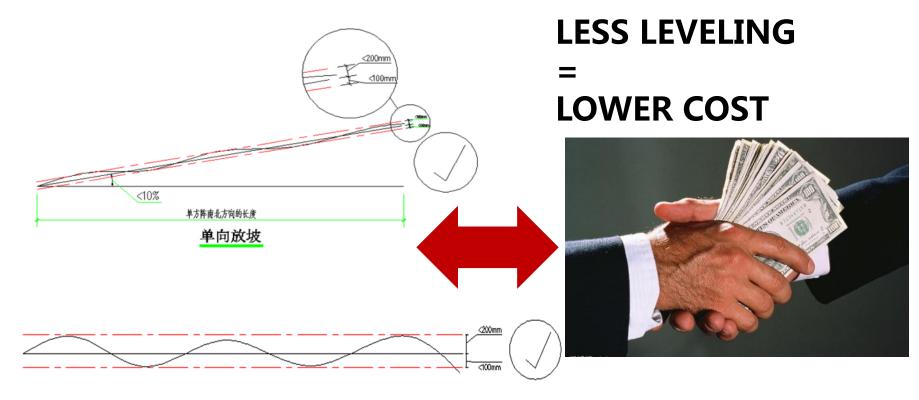
## **Advantages**



## High flexibility for uneven topography



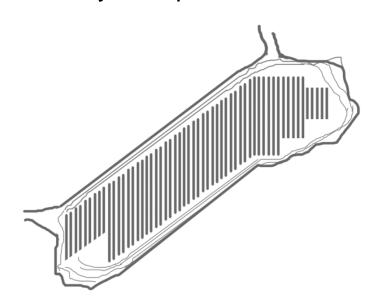
#### **Lower Leveling Cost**



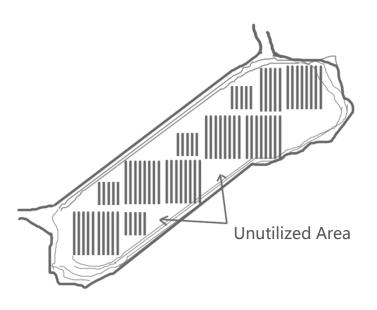
水平区域局部高差要求

#### **Higher Utilization**

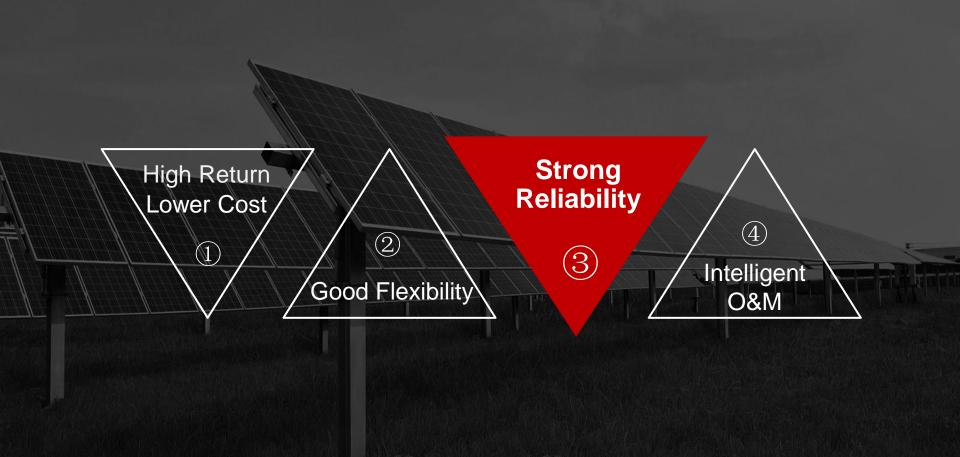
34% Land Utility Increase after Layout Optimization

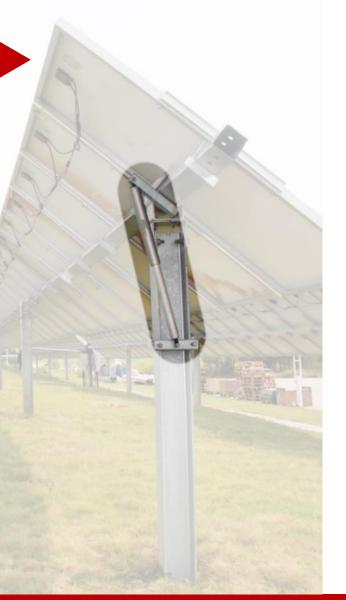


**Un-utilized Land** 



## **Advantages**





#### Anti-vibration—Damper

Dual Direction Damper interlocks to offer rigid support to avoid fasteners' resonance & loosening in case of tornado Anti sudden shock;

#### **Multiple Protection System**



#### **High Reliability-Anti-thunder**





Anti-thunder design protects the electric equipments from damages during thunderstrike

#### **Quality Control**



- All main components come from famous brand and UL certificate.
- All components have large temperature range.



#### Motor

UL certificate
Same quality standard
to wind power motor.



#### **Control Box**

Strict material selection Special coating material. Prevent the corrosion of acid rain

#### **Leading Brands Guarantee Quality**



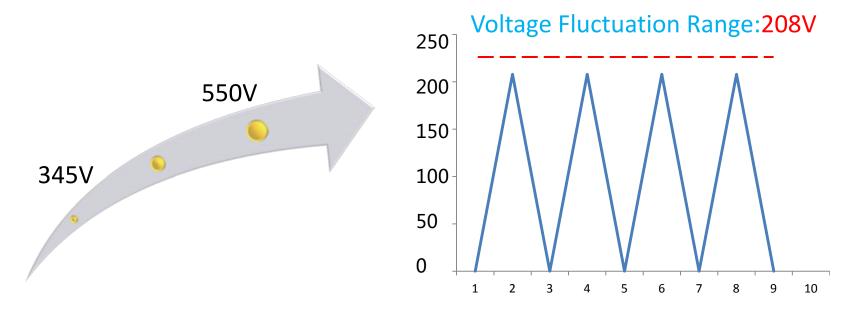




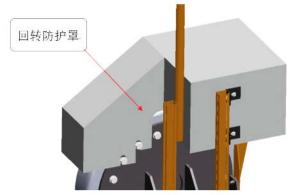
**ABB** 

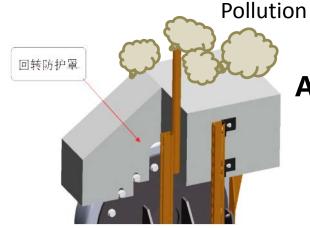
International Leading Brands guarantee Excellent Performance & Precise Control!

#### Wide Voltage Range



Fluctuating electric net grid 342—550 V in the range of 208 V, with low requirement on electric net grid.





#### **Anti-sand Shield**

Every slew drive can resist the corrosion from pollution with the use of shield.

#### **Protection Level——IP65**

Completely sealed from dust at 20 milibar air pressure; No rain leakage

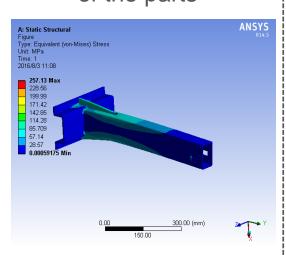


## **PowerTracker Datasheet**

	Syste	em datasheet	
Type	Powerlink	PowerMax	PowerFit
Model	Horizonal single-axis tracker		
Capacity(DC)	100kW ~ 400kW	100kW ~ 250kW	25~30kW
Maxomal system voltage	1000V/1500V		
Range of Tracker	$\pm 60^{\circ}$		
Generation gain(VS fixed tilt)	10% ~ 25% (subject to our terms)		
	Mec	hanical data	
Drive model	Universal couple	Linkrod	Self-drive
Material	Hot dip galvanized steel + aluminium alloy		у
Maximal linkage	24	24	
Modules in each string	Max 90	Max 64	Max 90
Slope(E-W)	<10°	<5°	No limit
Slope(N-S)	<10°		
Size	Different as the module quantity		
compatibility	mono-crystalline/Polycrystalline /Thin film		
Layout	Landscape/Portrait		
Terrain clearance	>400mm		
Foundation	H section steel/concrete		
Maximal load wind	144km/h (or be customized)		
Maximal operation wind	72m/s (3S)adjustable		
Stow time	<5 mins		
	Ele	ctrical data	
Power voltage	3W+PE 380/480VAC	3W+PE 380/480VAC	24VDC
	L+N+PE 110/220VAC	L+N+PE 110/220VAC	24VDC
Power frequency	50/60HZ	50/60HZ	
Rated power	1.5kW	1.5kW	300W
Motor	AC motor	AC motor	DC motor
Controller	PLC		
Track strategy	astronomical algorithms +tilt sensor close loop		
Accuracy	$\pm 2^{\circ}$ (or customized)		
Night model	Yes		
Backtracking	Yes		
Rain model	Yes		
Snow model	Yes		
Operation temperature	-25° C to 55° C		
IP Grade	IP65		
Communication interface	RS485/Modbus		

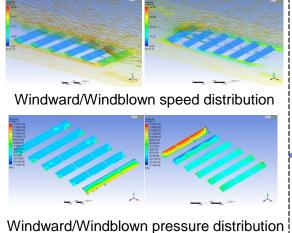
#### **Simulation Testing**

Ansys
Simulating the stress
of the parts



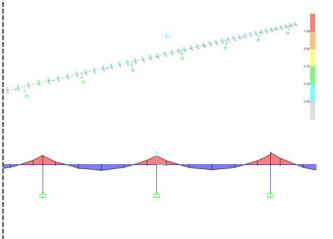
#### **FLUENT**

Fluid mechanics analysis



#### **SAP2000**

Structural analysis and design



#### **Testing**



Wind tunnel test



**Neutral Salt Spray Test** 



**Mechanics Performance Test** 



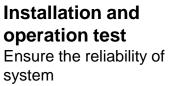
**Extension Test** Verify the theoretical calculation data accuracy many times





Lifetime test: Main components reliability test; Include: Load, impact load, accelerated aging, high-low temperature test, IP garde、UV.





#### Third-party certificate and patent certificate

- Authority certificate to guarantee our quality.
- 60 patent certificate













### **Certificate of Module Compliance**

#### JA SOLAR

JA SOLAR Holdings Co., Ltd NO. 36, Jiangchangsan Road, Zhabei District, Shanghai, China Tel:+85 (21) 6095 S808 Ernall: sales@jacolar.com

#### Declaration Letter

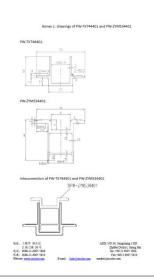
Neerby JA, Solar decises that clears type PW-TC44602 and PW2-TM554601 from Powerway, drawings as name 1, can be used for mounting of JA Solar model type JAMP-72-ava and JAMA(45-72-ava only if the initiation is in accordance with JA's installation manual, as weblink http://en.jasolar.com/site/dewnload\_manual. And the JA models by means of this installation hillfill the 2400pa mechanical load text in compliance with 50-2131-2005.

Shanghai JA Solar Technology Co., Ltd.



地址: 上海市 附北区 江场三路 36 号 电话: 0086-21-6095 58 特賞: 0086-21-6095 58

| Table Destroit Shang He | Table Destroit Shang He | Tab - 16 21 6065 5005 | Fax - 8621 6095 5016 | Fax - 8621 6095 5016 | market(j)asolar.com | market(j)asolar.com |







JITHOUSER

JEGO SHARES, 29 Shoupers Head Project
Exercit. Sharepai, Crisis
Fustions 200172

Pol., 48 21 51886777

Par. 75 21 21 219930

Sept 14,2016

Dear Sir or Madam

We hereby declared that the Power Tracker (Single Axis Tracking Mechanism) from Powerway has been reviewed by JinkoSolar which they have successfully employed in their single axis tracking projects. It has been reviewed by JinkoSolar and is compatible.

It's only valid with Power Tracker and this certificate is to demonstrate Jinko Sotar can be used under Single Axis Tracking Mechanism.

It has been proved that Powerway can help reduce overall steel costs and will yield in a better economical solution for the best of results.

Best regards.

Richard

JinkoSolar

Jinko Building, 99 Shouyang Road, Jingar Clathot, Shanghai, China

Smart Energy Together

October 17,2016

To whom it may concern.

We hereby declared that the Power Tracker (Single Axis Tracking Mechanism) from Powerway has been reviewed by Trina solar which they have successfully employed in their single axis

tracking projects as given below:
- JIT, 74 88 Kwp in France
- Ston, 435 Kwp in America
- Steelcons, 120 Mwp in Brazil

Has been reviewed by Trine solar and is compatible with all our mono and polycrystalline offerings of the solar modules by mounting them with the help of short rails with the help of extra solor an either sole of the module which are at a distance of 560mm apart from the standard helps which are at a distance of 1576mm.

All other installation procedures and requirements shall refer to Trine's Installation Manual.

We believe that Powerway will support their best in order to help us in this case reducing our overall steel costs which would yield in a better economical solution for the best of results.

est regards.

na Solar

Add: No.2 Transe Road Trina PV Industrial Park, New District Changzhou, Jiangsu B-mail: salis@trinespier.com

### **Certificate of Inverter Compliance**



#### Certificate Of Technical Compliance

Power Tracker from Powerway is compatible with Huawei inverter. Huawei inverter can provide power and communication ports for power trackers, and Huawei management system can monitor the power trackers. This system has been used in multiple projects.

- 1. The Power Tracker System is compatible with the communication ports in Huawei Inverters. The Power Tracker models are factory-equipped with a communication port that allows for Plug & Play integration of the Huawei Inverters. The Huawei data channel can greatly reduce the cost for cables and additional wiring work. No further modifications are required.
- 2. The on-site power source from Huawei's inverter is capable of providing power directly to

the drive motors of Power Tracker system. The ability to utilize the AC output of Huawei' a Inverters eliminates the need for external power sources and reduces cables and additional wiring work throughout the project.

3. Huawei FusionSolar Smart PV management system can monitor & manage the status of Powerway power trackers. Remarks: FusionSolar Smart PV management system is saleable ed regions. This function relies on the corresponding management system





#### **Declaration of Technical Compliance**

This is to confirm that, Powerway's PowerTracker has been reviewed by Sungrow's technical team, and is proved to be technically compliant with the operation standard of Sungrow's inverter. The following features have been acknowledged as functioning components by Sungrow. These components conform to the requirements of Sungrow, allowing for a safe and easy system integration without additional hardware or on-site modifications.

- 1. All Powerway PowerTracker Systems are compatible with the operation system of Sungrow Inverters. The PowerTracker models are factory equipped with a communication plug that allows for Plug & Play integration of the Sungrow Inverters. Utilizing the Sungrow data channel, drastically reduces the costs for cables and additional wiring work. No further modifications are required.
- 2. The on-site power source from Sungrow's central inverter is able to directly provide electricity to the drive motors featured in PowerTracker models. Being able to utilize the AC output of the Sungrow central Inverter, eliminates the need for external electrical sources and reduces cables and additional wiring work across
- 3. Integrated operation maintenance of Sungrow Inverters allows for easy centralized management. Real time data can be received from the PowerTracker models and fed directly into Sungrow's automatic solar management software for processing and evaluation.

To offer one stop solution to the market, Sungrow is committed to work closely with Powerway's team in any solar farm projects, and endeavour to support our customers with the most economical and cost effective technical solution.





Senior Vice President of PV & Storage Product 25th Oct. 2016











#### **QC** control



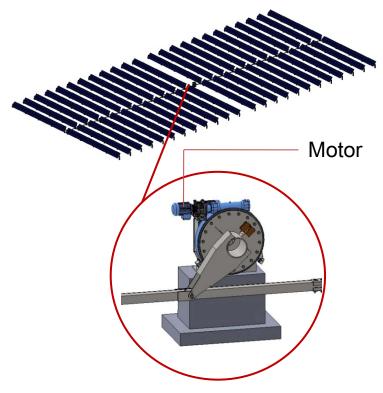
## **Advantages**



## **Bearing saves maintenance**



#### **Lower Maintenance**



Powerway 1x40x15 array	
Motor No.	6
Module No.	3600 pcs
Module Rate	320W
Total Rate	1.15MW

1x90x1 array		
Motor No.	<sup>40</sup> ×	
Module No.	3600 pcs	
Module Rate	320W	
Total Rate	1.15MW	

Same Output Rate, Lower Maintenance, WITH 85% LESS MOTORS!!

#### **Customized Parts**

## **Localized Fastener**









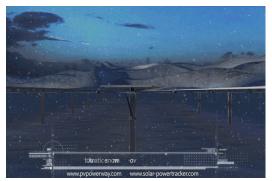






### **Different operation models**

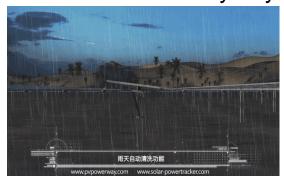
Automatic snow remove

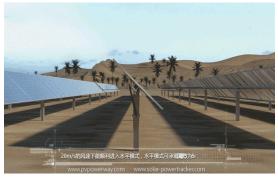


WHAT REPORTED THE PROPERTY OF THE PROPERTY OF

Backtracking

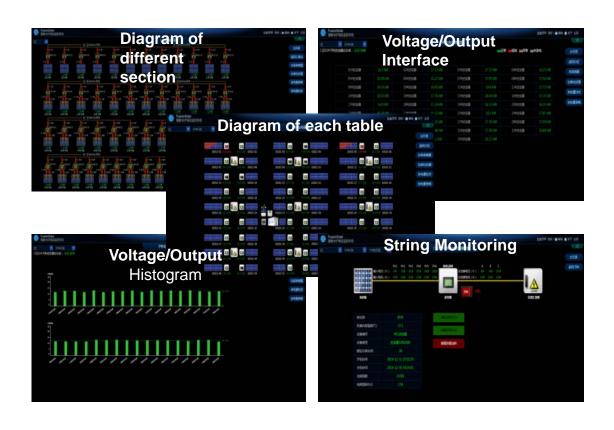
model clean in rainy day





Stow in strong wind

# Different sections and string monitoring, direct management of each motor



#### **Layout and state**

High precise string monitoring, prompt identification for module failure

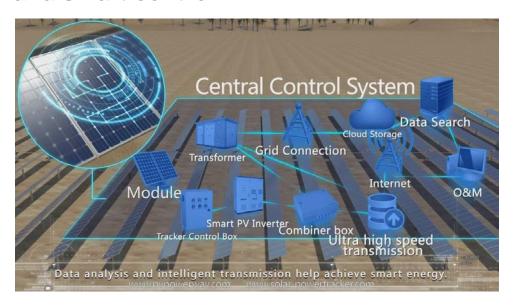
Live monitoring based on device location, logical topography and electric allocation, highly visibility.

Indicate power generation and power of module by table, histogram.

Precise indicate parameter of individual device

#### Intelligence and low-cost O&M

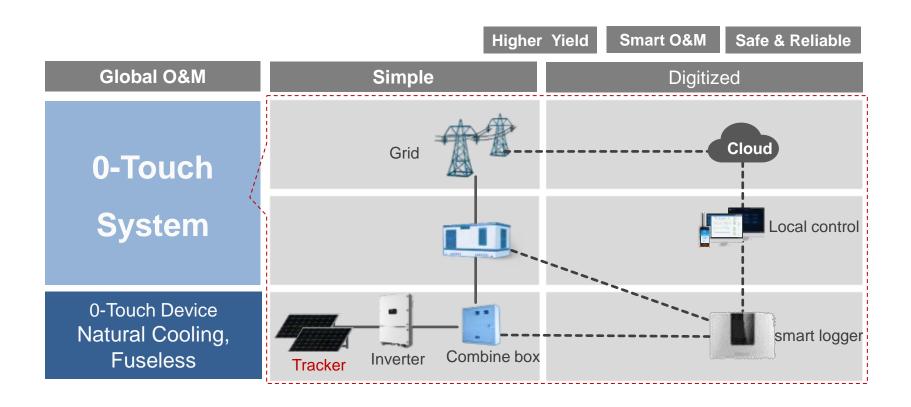
Intelligence tracking system integrate cloud computing, remote monitoring and smart control.



# Global power plants centralized managements



### **Digital O&M**



## **Perfect tracking service support**



