

Eyeing the Sun

HEADQUARTERS
Sun Action Trackers

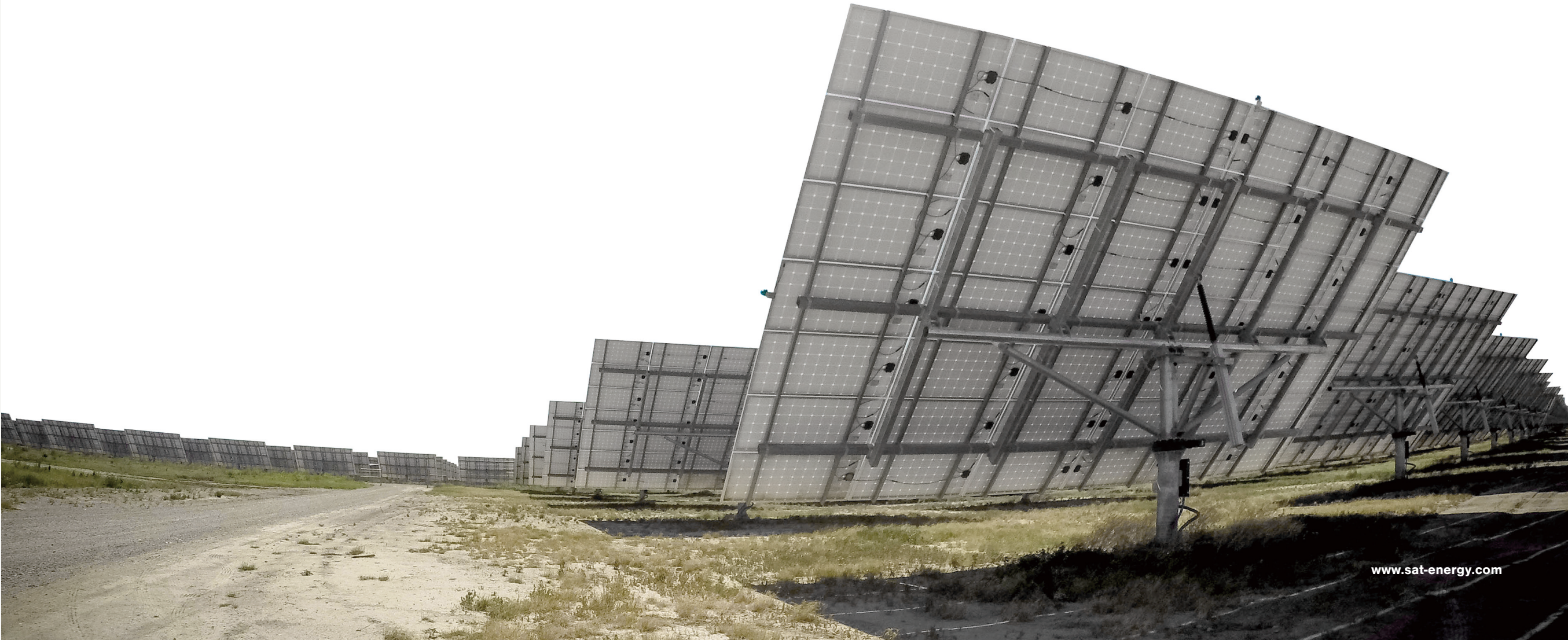
15143 Tradesman Dr,
San Antonio, Texas
+1 210 585 8224
www.sat-energy.com
info@sat-energy.com



Trace the sun
Capture the benefit



Visit our YouTube Channel
for product videos



1.5 GW WORLDWIDE

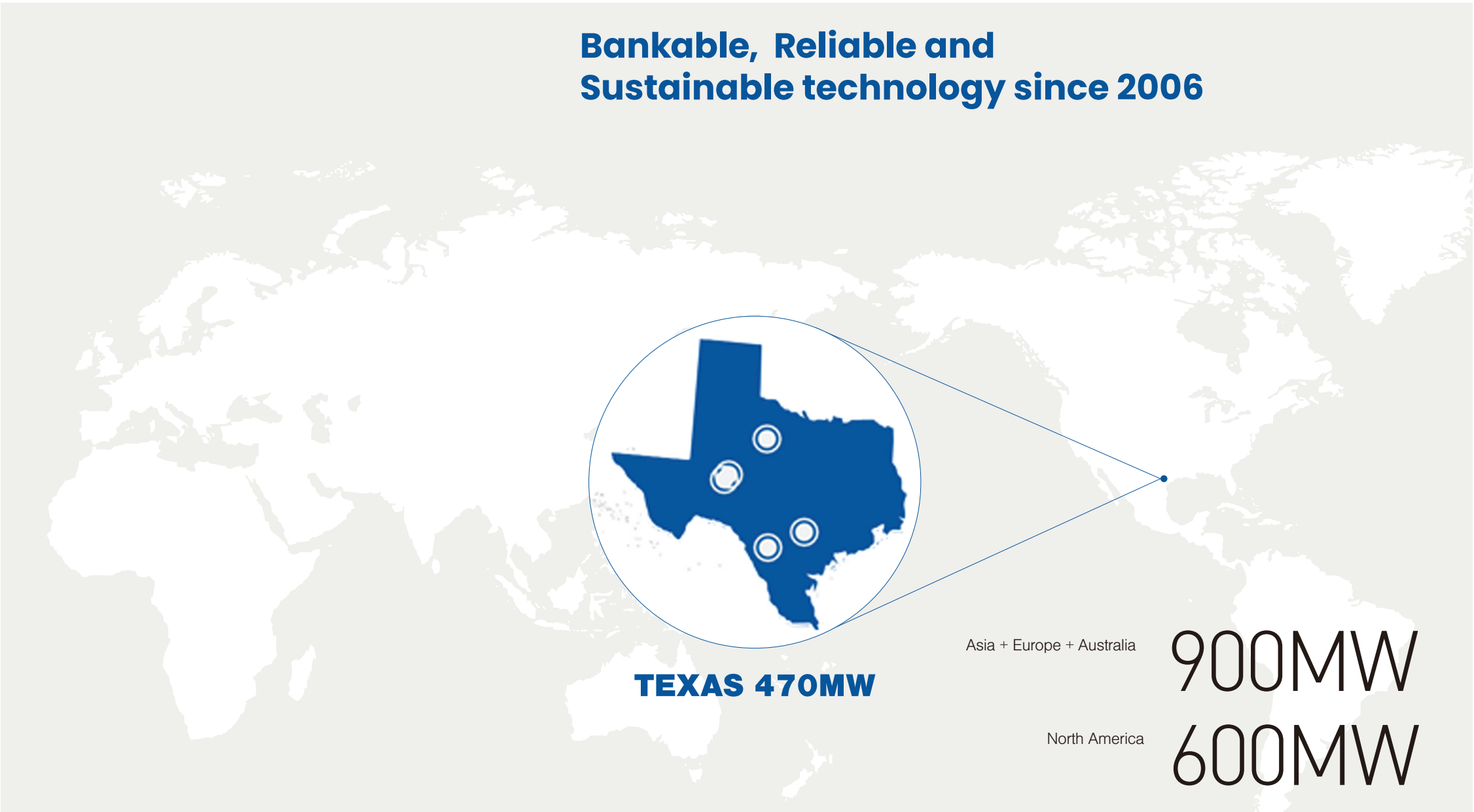
Sun Action Trackers is the worldwide leader in solar tracking and solar carport system manufacturing for utility, commercial, and residential projects, with over 1.5GW of deployments across the globe. Through more than 20 years of R&D efforts, Sun Action Trackers innovations in solar tracking systems and solar carports continue to provide the lowest product costs with reliable, durable and robust systems.

Reliability & Bankability YOU CAN COUNT ON

Sun Action Trackers guarantees bankability and stability of our products and technology with Technical Due Diligence Reports from Black & Veatch and UL. We provide breakthrough solar tracking systems that are reliable and efficient.



Bankable, Reliable and Sustainable technology since 2006



International 1.5 GW

Dual Axis Tracker



Single Axis Tracker



Solar Carports & Canopies



Installation



LET US SERVE YOU

Engineering and Design

At Sun Action Trackers, we provide engineering services such as: **Engineering & Design, PESTamps** and **PVSYST Analysis**. We are committed in guiding you through every aspect of your project planning.

Operations & Maintenance

Sun Action Trackers offers operations and maintenance services to ensure your project performs to your customers expectations.

Site Installations

Sun Action Trackers offers an experienced group of installers who will assist you with your tracker / carport installation at very competitive prices.

Certifications & Trainings

Sun Action Trackers offers a partner certification program that allows us to certify integrators small and large, and allow for them to install our products in any sized project.

Site Commissioning

As part of our services, we offer site commissioning support which will guarantee accuracy of installation and performance of our tracking technologies.



DUAL AXIS TRACKER

DualTrack 24/42/48

Sun Action Trackers DualTrack 24/42/48

Bankable, Reliable and Sustainable technology partner since 2006

►1.5 GW deployed, 2000 projects, Active in 50 states and 20 countries

DualTrack tracking technology produces the maximum efficiency of the solar PV regardless of extreme weather and temperature conditions. With high reliability and an advanced technology control/operating system along with automatic safety control functions, DualTrack produces stable electricity throughout the year. DualTrack holds 13 international patents on its core technology and has international certifications, including UL, B&V(BLACK&VEATCH). SAT continues to improve and develop better quality products using advanced technology by working with in-house R&D. DualTrack offers different versions of our tracking system which cover the Residential (24 solar panels) and Utility/ Commercial/ Agricultural (42 or 48 solar panels) market segments.



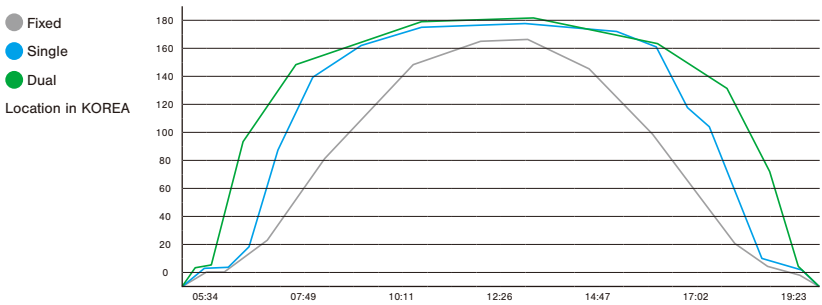
Discover the key to the success of your Solar project by using DUAL AXIS TRACKERS!

SAT's patented technology has proven robust in poor environmental conditions around the world.

World Best No.1 Dual Axis Tracker

- World's largest single project deployment of 400MW Dual Axis Trackers.
- Proper cost comparison is Dual Axis Tracker cost vs Single Axis Tracker/Fixed Tilt Array + Civil cost.
- The "All Terrain" Dual Axis Tracker can be installed and operated in nearly any terrain, including flood zones, landfills, farmlands, hill and mountain slopes with zero civil costs and requires less environmental impact studies.
- Reduce DC project size (# of modules) by 20-45% by using Dual Axis Trackers and achieve same AC output as single axis or fixed tilt arrays.
- In general, Dual Axis Tracker generates 45% more than Fixed tilt and 25% more than Single Axis Tracker (Actual results may slightly vary by region).
- DualTrack can be installed and operated in in heavy snow regions and flood zone areas as clearance under tracker at full tilt can be as high as 10 feet (even higher with foundations above grade).
- DualTrack removes any concerns with major components rusting. Our MAC steel is 5-10 times more corrosion resistant than HDG/Galvanized steel used by most of our competitors.
- Our patented real-time sensing technology increases production by 4-6% as compared to traditional GPS based tracking systems used by all of our competitors.
- Dual Axis Trackers used in combination with Bifacial solar modules provides the greatest energy harvest of any technology in existence. This is especially important in maximizing output in areas that have DC or AC caps by meter or by customer account(s).

TYPES OF SAT TRACKERS



Fixed type

GOOD CHOICE

100 %

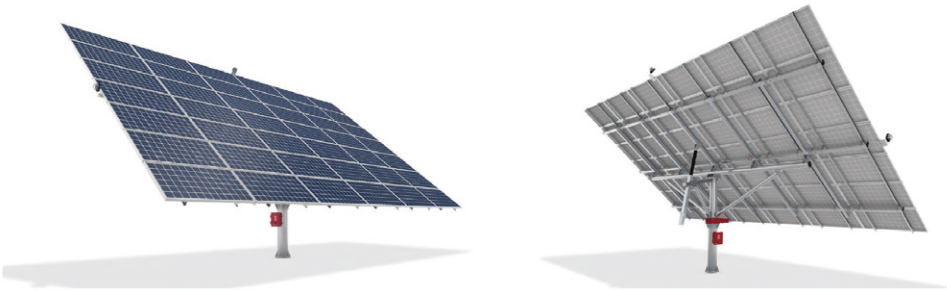
Dual type

BEST CHOICE

Up to 145 %

Dual Axis Tracker Specification and solar panel configuration

1 DAT 24/42/48



Components : 1 Unit

- 1 Actuator
- 1 Slew Drive
- 2 Solar Sensor
- 1 Controller

Technical Data - PST-2AL

General Features			
Tracking type	Dual Axis		
Module Area (Max)	Number of Solar Panels		
Model	DualTrack 24	DualTrack 42	DualTrack 48
System Weight	1,520kg	2,200kg	2,400kg
Tracking Axis	Dual axis; azimuth & vertical		
Tracking Range of Motion	Azimuth -135° to +135° Vertical: 0° to 60°		
Azimuth Rotation	Slew Drive		
Vertical Tilt	Linear Actuator		
Materials	Magnesium Alloy Coated Steel / Hot Dip Galvanized		
Snow Load	50psf standard, It can be higher as custom design		
Technology Features			
SolarTracking Method	Real-Time Solar Sensor		
MaximumWind Speed	Standard 105MPH ACC. ASCE 7-05		
Safety Mode (Automatic Horizontal)	Wind mode / Low light conditions		
Safety Mode (Tilted Position)	Snow mode		
Temperature Range	-35° to 55°C (-13° to 131°F)		
Services, Installation & Maintenance			
PE Stamped Structural	Yes		
Calculations & Drawings	Yes		
On-site training & System Commissioning	Yes		
Connection Type	No field welding required		
Certifications / Warranty			
Patented Technology	Real-Time Sensor		
Warranty	5 years critical parts / 10 years structure warranty.		
Certification	Backability – UL / Black & Veatch		

Utility

48
Modules
(8x6)

Commercial Agricultural Industrial

42
Modules
(7x6)

Residential

24
Modules
(6x4)

Applications

Utility



Commercial/Agricultural/Industrial



Residential



“All terrain” Tracker

Adaptive to multiple terrains and soil conditions,
NO civil work at project site compared to single and fixed tilt systems.

- It can be installed and operated in nearly any terrain, including flood zones, landfills, farmlands, hill and mountain slopes with zero civil cost
- SAT's DualTrack is perfect for your utility, agricultural, commercial, and industrial projects. DualTrack can be mounted with 24 or 42 or 48 panels (72cell solar panel).
- Minimum environmental study and permit requires due to NO civil and flatting work.



Rice farm



Operating Tracker during the work in rice farm



Carport



Hill fields



HILL FIELDS



FLOOD FIELDS



SLOPE

SINGLE AXIS TRACKER

SingleTrack

Sun Action Trackers SingleTrack

Sun Action Trackers Single Axis Tracker “SingleTrack”

Bankable, Reliable, and Sustainable technology partner Since 2006

Sun Action Trackers' "SingleTrack" is the tracking system for customers looking for both an economic and high return investment solution in areas with low electric rates.

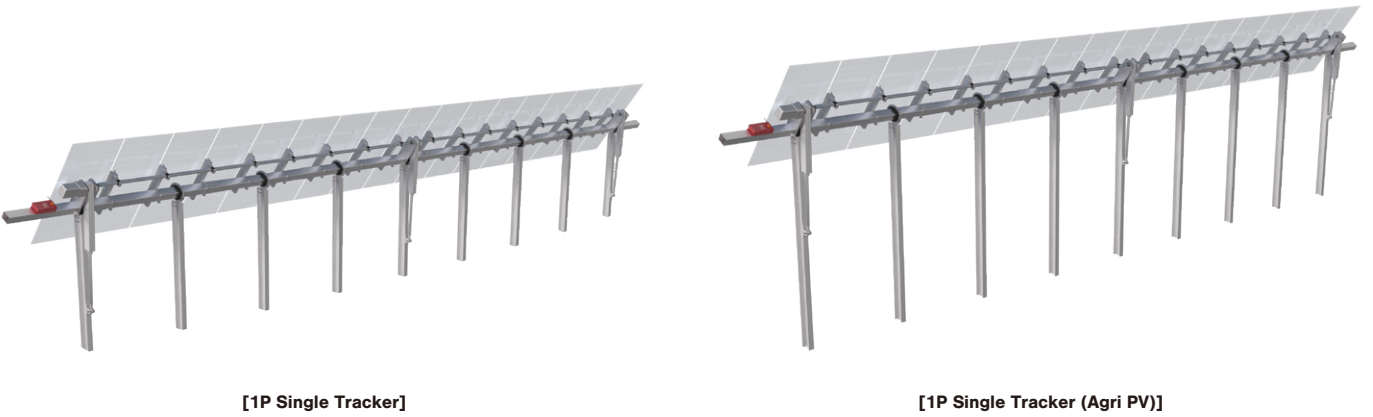
Sun Action Trackers offer three different tracker options based on specific project needs - Terrain Adapted 1 P Single Axis Tracker (TAS-1 P), Linked 1 P Single Axis Tracker(LS-1 P)



Discover the key to the success of your Solar project by using SINGLE AXIS TRACKERS!

SAT’s patented technology has proven robust in poor environmental conditions around the world.

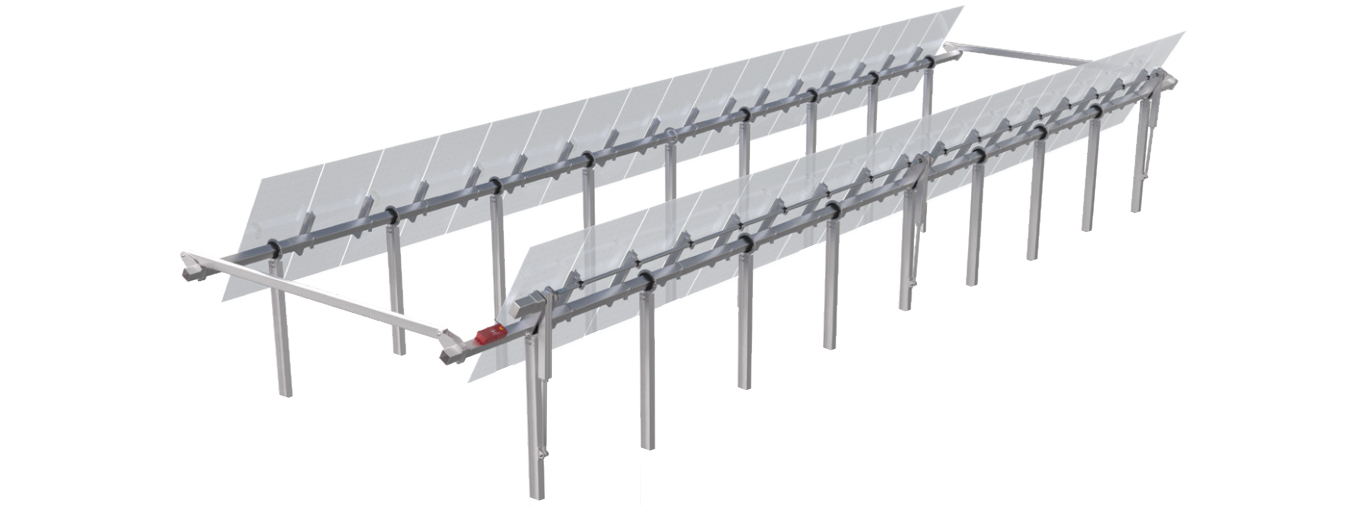
- Our Single Axis Trackers have the lowest, optimized production costs regardless of project size.
- Designed for simple assembly allowing for rapid installation which results in quicker project completion.
- Minimizing Annual Power Consumption: During overcast days, system stows horizontally which reduces power needed for motors, reducing parasitic array loss.
- Maximizing Output on Cloudy Days: During overcast days, system stows horizontally, allowing for more collection of diffuse light, which increases array output.
- High Reliability and Durability: Utilizing the Magnesium Alloy Coated Metal has resulted in higher corrosion resistance quality and longer steel life.
- Low Maintenance and Outstanding Longevity: Automatically drives to stow position as safe mode at high wind speeds. Mechanical protection from tracker over-travel. The simple and robust design requires minimum maintenance time and budget.
- “All terrain Singletrack” can be installed and operated in most terrains with less civil costs. Single Axis Tracker minimizes environmental studies, and additional permitting required with the civil work activities.
- Reliable and robust actuator drive system with 20 years of development efforts to lower maintenance requirements.
- The Singletrack does not waste energy with any unnecessary movements.
- The Singletrack is equipped with low voltage DC motors that require low maintenance and minimal downtime.
- Unsophisticated, outstanding, robust, and competitive design.



1P Single Tracker (S-1P)

Tracker Type	Single row single axis horizontal tracker(1module in portrait)
Solar tracking method	Astronomical algorithm with backtracking standard.
Tracking Range	Up to 120° (± 60°)
Control System	"Electronic board with microprocessor, 1 tracker controller per tracker; 1 central controller per 100 tracker controllers"
Communications	Wireless LoRa mesh network
Drive System	Multiple linear actuator
Peak power per tracker	Up to 66 kWp per tracker (with 600Wp modules). Row length up to 130M (110 panels)
Power supply	"AC POWERED: Customer-provided 110-240 VAC circuit Options : Self powered with dedicated small PV module and Li-FePO4 battery"
Power Consumption	In real activate condition, come approx. 200W±10% power consumption.
Ground Coverage Ratio	Fully configurable by customer; typical range 25%-50%
Foundation Types	Compatible with all major foundation types (driven pile, concrete foundation, ground screw)
Standard Wind Design	0°:105mph(47m/s), 60°:56mph(25m/s), ASCE7-10, configurable for higher wind speeds
Defensive stowing functions	Wind, hail, hurricane, snow, rain
Principal Materials	Hot deep galvanized steel, Pregalvanized steel, Magnesium alloy coated steel
Compliance	structural design: ASCE7-10
Piles per MW 600Wp module	~258 piles/MW
Other Available Options	Snow sensors
Warranty	10-year structural, 5-year drive and controls standard; extended warranty available

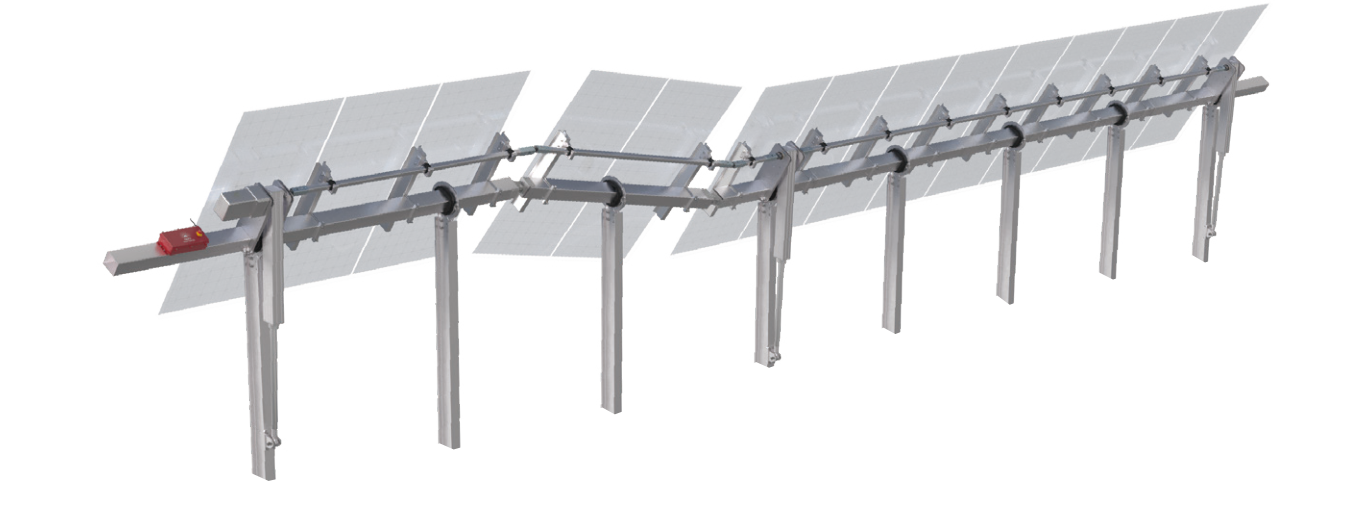
* The above specifications could vary according to local conditions



Linked 1P Single Tracker (LS-1P)

Tracker Type	Double row single axis horizontal tracker(1module in portrait)
Solar tracking method	Astronomical algorithm with backtracking standard.
Tracking Range	Up to 120° (± 60°)
Control System	"Electronic board with microprocessor 1 tracker controller per tracker; 1 central controller per 100 tracker controllers"
Communications	Wireless LoRa mesh network
Drive System	Multiple linear actuator
Peak power per tracker	Up to 84 kWp per tracker (with 600Wp modules). One row length up to 82M (70 panels)
Power supply	AC POWERED: Customer-provided 110-240 VAC circuit Options : Self powered with dedicated small PV module and Li-FePO4 battery
Power Consumption	In real activate condition, come approx. 250W±10% power consumption.
Ground Coverage Ratio	Fully configurable by customer; typical range 35%-50%
Foundation Types	Compatible with all major foundation types (driven pile, concrete foundation, ground screw)
Standard Wind Design	0°:105mph(47m/s), 60°:56mph(25m/s), ASCE7-10, configurable for higher wind speeds
Defensive stowing functions	Wind, hail, hurricane, snow, rain
Principal Materials	Hot deep galvanized steel, Pregalvanized steel, Magnesium alloy coated steel
Compliance	structural design: ASCE7-10
Piles per MW 600Wp module	~262 piles/MW
Other Available Options	Snow sensors
Warranty	10-year structural, 5-year drive and controls standard; extended warranty available

* The above specifications could vary according to local conditions

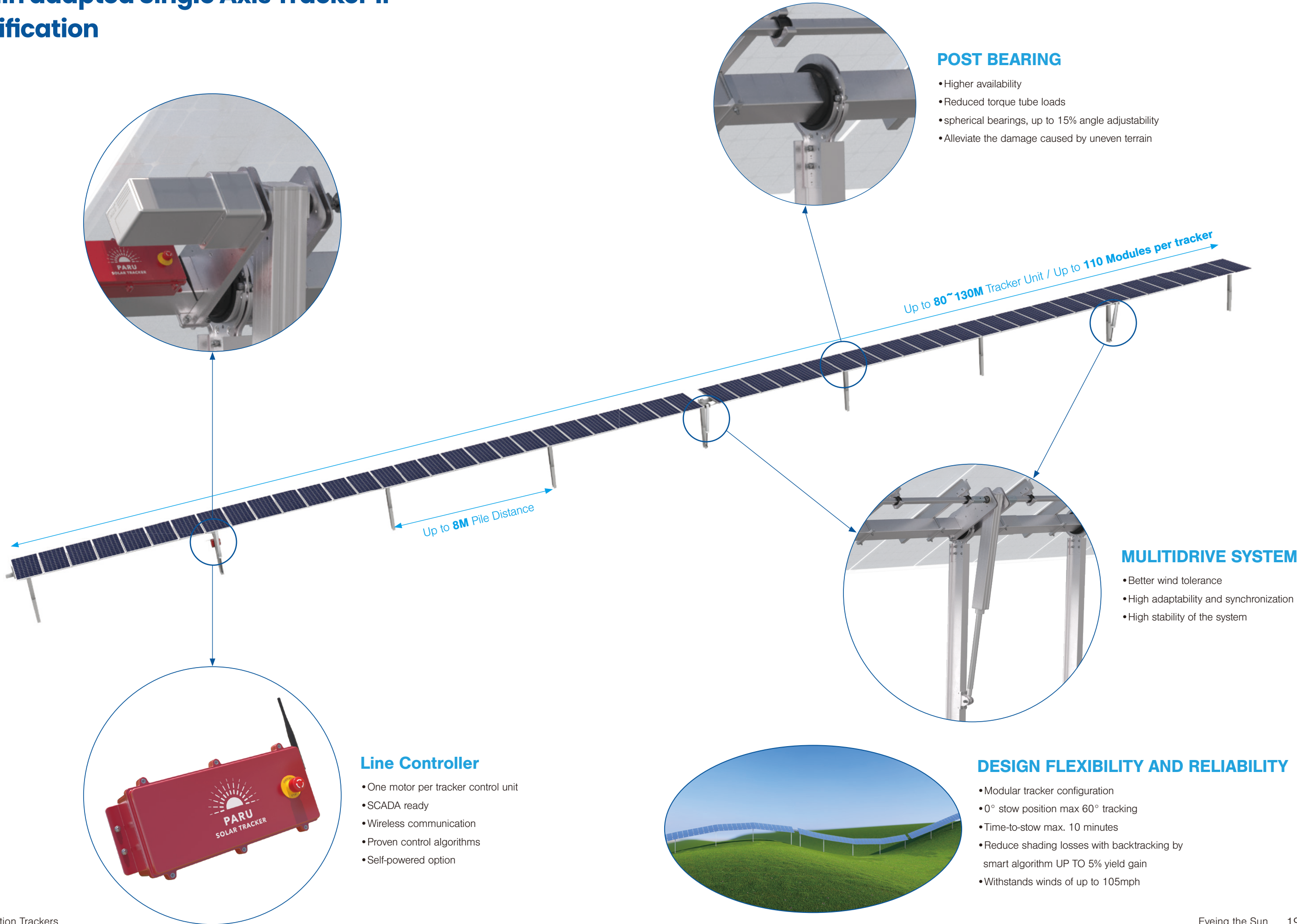


Terrain Adapted 1P Single Tracker(TAS-1P)

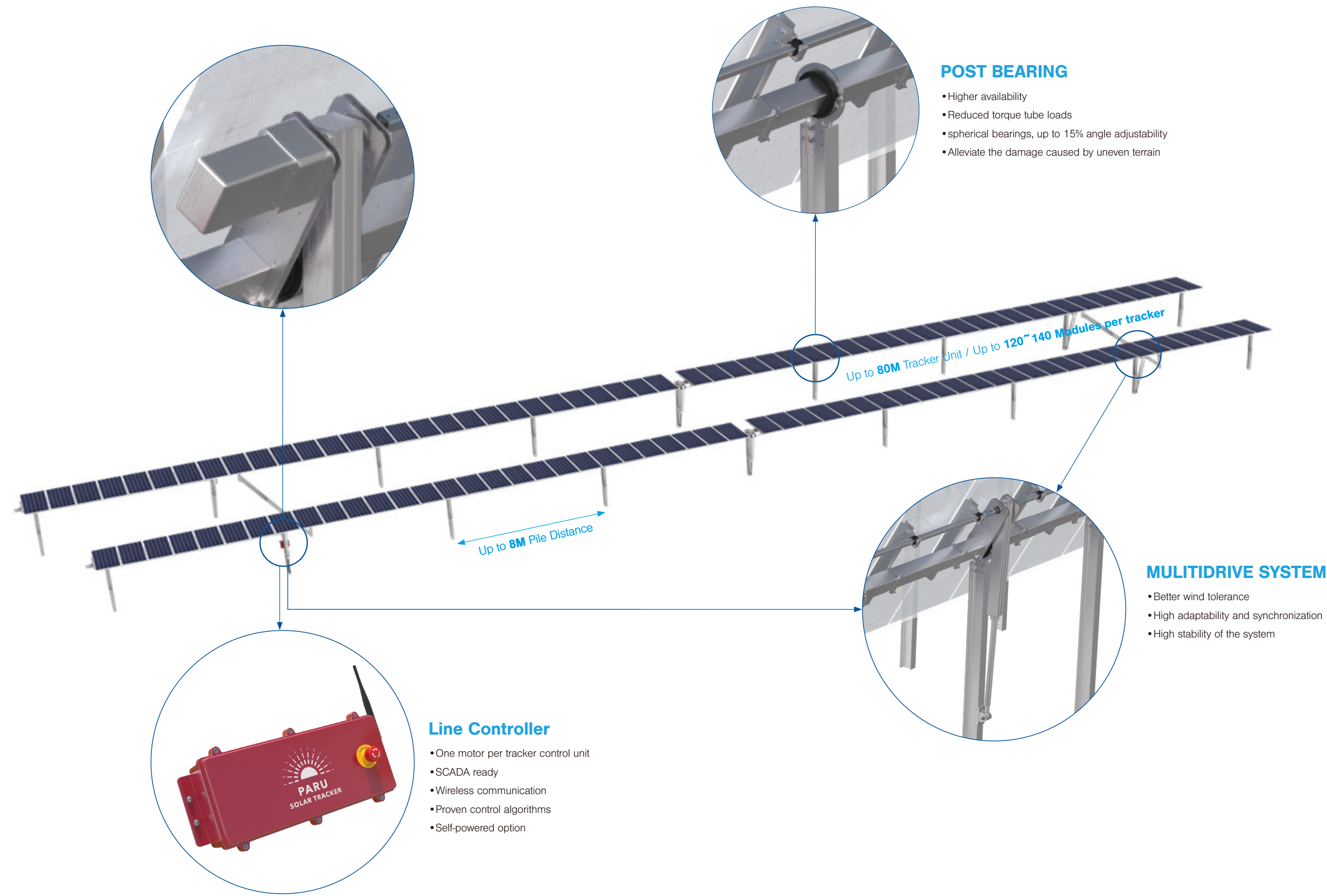
Tracker Type	Single row single axis horizontal tracker; Any tracker alignment possible (ideally along North-South direction)
Solar tracking method	Astronomical algorithm with backtracking standard.
Tracking Range	Up to 120° (± 60°)
Control System	"Electronic board with microprocessor 1 tracker controller per tracker; 1 central controller per 100 tracker controllers"
Communications	Wireless LoRa mesh network
Drive System	Multiple linear actuator
Peak power per tracker	Up to 51.6 kWp per tracker (with 600Wp modules). Row length up to 101M (86 panels)
Power supply	AC POWERED: Customer-provided 110-240 VAC circuit Options : Self powered with dedicated small PV module and Li-FePO4 battery
Power Consumption	In real activate condition, come approx. 200W±10% power consumption.
Ground Coverage Ratio	Fully configurable by customer; typical range 25%-50%
Foundation Types	Compatible with all major foundation types (driven pile, concrete foundation, ground screw)
Standard Wind Design	0°:105mph(47m/s), 60°:56mph(25m/s), ASCE7-10, configurable for higher wind speeds
Defensive stowing functions	Wind, hail, hurricane, snow, rain
Principal Materials	Hot deep galvanized steel, Pregalvanized steel, Magnesium alloy coated steel
Compliance	structural design: ASCE7-10
Piles per MW 600Wp module	~252 piles/MW
Other Available Options	Snow sensors
Terrain adaptability	15% N-S
Warranty	10-year structural, 5-year drive and controls standard; extended warranty available

* The above specifications could vary according to local conditions

Terrain adapted Single Axis Tracker 1P Specification



Linked Single Tracker(LS-1P) specification

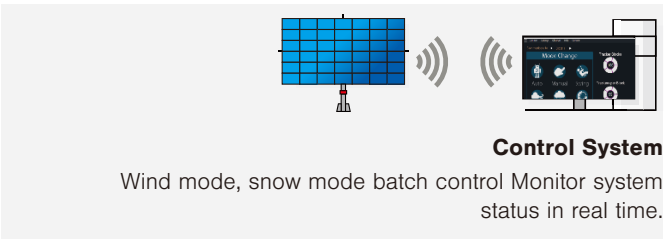
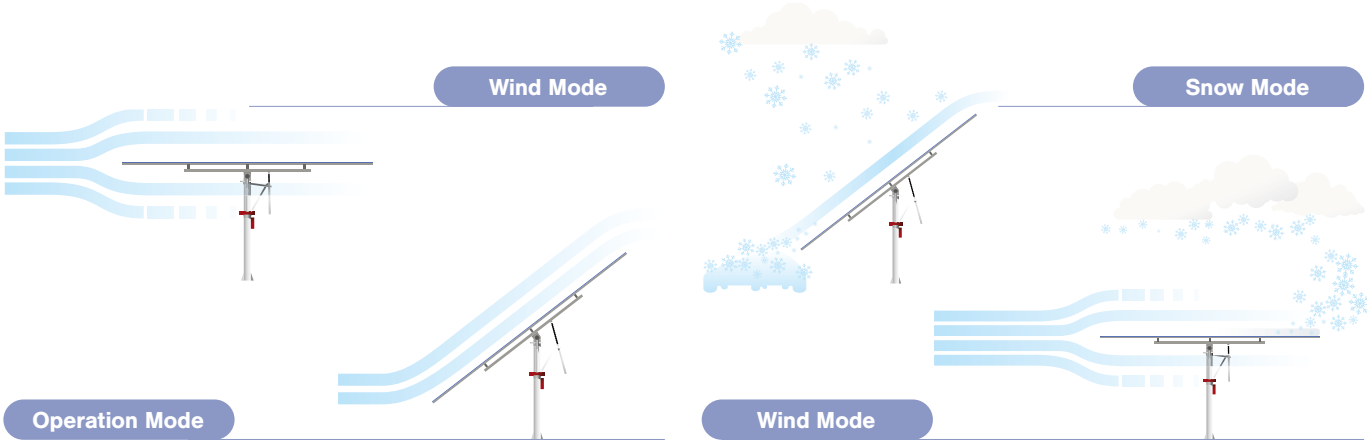


Key Benefits of using Dual Axis & Single Axis tracking systems

Technology to minimize damage caused by wind loads and snowstorms

Wind Mode

When defined wind speed is detected, trackers move to stow mode to protect project investment. Once the wind speed has returned to normal operational tolerances, trackers will return to work. Operational Wind Loads support up to 45mph(20m/s) before Stow mode initiates



Snow Mode

Certain environments require the use of snow shedding and other accommodations to keep trackers working year-round. With the use of Real Time Sensing, SAT can determine snowy and overly cloudy conditions and move to snow mode, Snow Mode sends the tracker into a 60-degree tilt to easily shed snow from the solar panels and keep snow from accumulating

CORE COMPONENTS OF SAT DUAL AXIS TRACKER



Controller

Solar and Wind sensors transfer signals to "Slew Drive" and "Actuator" to control the tracker according to user's configuration.

Real-time Sensor

Photo-diode sensors sense the location of the Sun and send signals to controller

- E/W Sensor, corresponding to the sun tracking in the East-West placement.
- S/N Sensor, corresponding to the sun tracking in the South-North placement.

Slew Drive

To control the horizontal (azimuth) angle of trackers.

- High torque transmission
- Reduced backlash
- Max. Load capacity and extended life

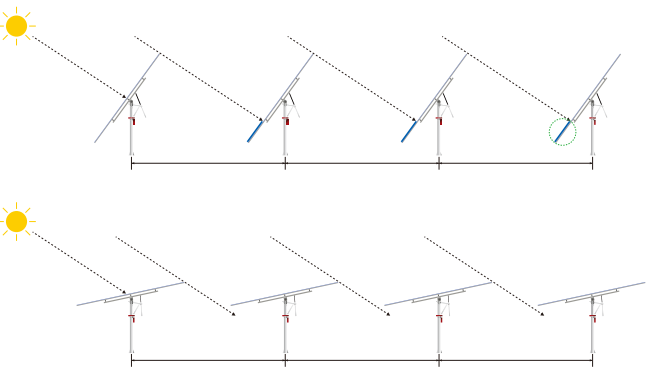
Linear Actuator

To control the vertical (elevation) angle of the tracker.

- High Degree corrosion protection
- Vibration resistance

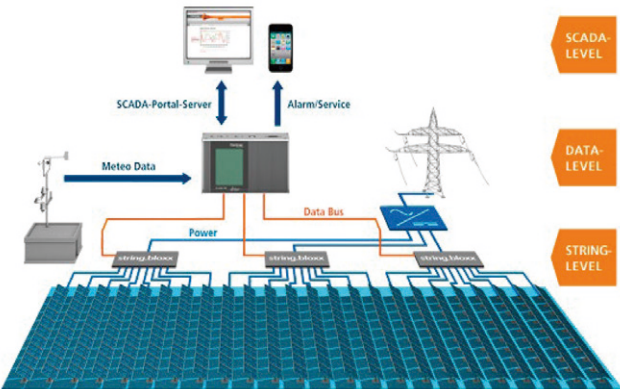
Key Benefits of New Terrain Adapted New Single Axis Tracker

Back Tracking



- When the sun's elevation angle is low in the sky, early or late in the day, self-shading between tracker rows has the potential to dramatically reduce system output.
- Backtracking rotates the array tilt away from the sun, eliminating deleterious effects of self-shading and maximizing ground cover ratio.

Tracker Control System (SCADA)



- Operates as an automatic tracking system when sunlight is normal
- Automatically switches to safe mode when the pre-defined wind speed is detected
- Automatically switches to snow mode by measuring external environmental conditions
- All and/or each tracker can be controlled manually override
- Communication can be controlled by wireless communication method

SAT I Bankability and Reliability



B&V Certification

- Certifications for both Dual Axis and Single Axis Technologies

UL Certification

- UL3703 certification of both Single and Dual Axis Technologies

TUV Certification

- Tracker

RWDI Certification

- Wind tunnel testing of Single Axis Technology

Patents

- International patents = 38
- Domestic patents = 485
- Intellectual Property Rights = 397



SAT Carport & Canopy Solutions



Your Full-Service Solar Partner Since 2006

When EPC’s and Developers need a dependable Solar Carport or Canopy mounting solution, they turn to Sun Action Trackers. As a Single-source provider, Sun Action Trackers is focused on reducing total project costs through complete responsibility for the Design, Engineering, Manufacturing, and installation of efficient PV racking solutions. When you choose Sun Action Trackers for your next solar carport, you’re choosing peace of mind that your project is in the hands of the most trusted racking team in the industry. **Since 2006, we have deployed over 1.5GW of Solar racking spanning over 8000 acres.**

Scope or Services offered

Design/Engineering

Sun Action Trackers team of in-house designers can provide complete structural and foundation design specifically designed for your site.

Manufacturing

Sun Action Trackers utilizes multiple manufacturing facilities worldwide to ensure our quality assurance standards while keeping costs minimized.

Installation

Sun Action Trackers provides installation and project management services for each carport installation with a focus on delivering on time and on budget

SAT Carport & Canopy Configurations



Single Row Fixed Carport - 3 panels in portrait



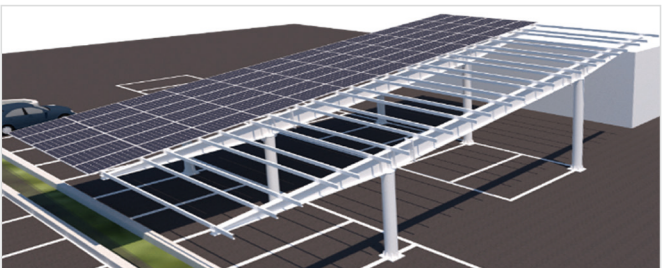
Two Row Fixed Carport - 7 panels in portrait



Two Row Inverted Carport - 6 panels in portrait



Double Post Carport - 8-11 panels in portrait



Long Span - Greater than 12 panels in portrait

Specification and Options

	Single Row Fixed Carport	Two Row Fixed Carport	Two Row Inverted Carport	Double Post Carport	Long Span Carport
Standard Panel Orientation	3 panels in Portrait	7 panels in Portrait	6 panels in Portrait	8 -11 panels in Portrait	Greater than 12 panels in Portrait
Custom Panel Configuration and Orientation	4 panels in Portrait 6 - 8 panels in Landscape	6 panels in Portrait 12 - 14 panels in Landscape	12 panels in Landscape	16 - 22 panels in Landscape	Greater than 24 in Landscape
Number of North South Foundations	1	1	1	2	2 or more
Tilt Angle	Standard is 7 degrees, Up to 8 degrees, Greater than 8 degrees is custom design				2 degrees, Greater than 2 degree is custom design
Minimum Ground Clearance	10ft from bottom of solar panel to ground, other clearances are available				
Column Spacing	18ft, 27ft East West, other distance are available			North South is custom design	
Carport Connections	Bolted connections, No field welding required				
Foundations	Sono-Tube / Spread Footing / Helical Pile				Sono-Tube / Spread Footing
Finish Color options	Galvanization, White (optional), Brown (optional), Black (optional)				
Water management	Water Gutter & Snow guard (optional), Sealing gasket between panels (optional)				



Reference

