

Si-Trak 160 Dual-Axis Tracker

The Si-Trak 160 Dual Axis Tracker is a high precision solar tracker suitable for Low Concentrate and Flat Plate modules

- Elegant design for strength together with long term reliability
- Patented azimuth/elevation controls for precise and smooth tracking
- Large tracking range for maximum daily power production
- Sophisticated, intelligent tracking controller
- Easy to install and maintain



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The Si-Trak Dual-Axis Tracker is designed to accept Si-Con concentrator PV modules and to ensure that these modules continuously track the Sun to absorb the maximum amount of direct normal light. High accuracy tracking of the Sun in this manner delivers between 25%-40% more power throughout the day as compared to fixed-tilt PV systems. This additional collected energy results in a lower installed cost per Watt of electricity as compared to fixed-tilt systems.

The Si-Trak Dual-Axis system tracks the Sun by moving the PV module platform in two planes; elevation and azimuth. The system incorporates a set of high resolution linear actuators which enable the tracker to rotate fully from 80° SE to 80° SW. This ensures that the tracker can follow the Sun and collect solar energy from sunrise to sunset at any latitude.

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Tracking Control System

The Tracking Control System (TCS) is an intelligent controller that continuously monitors the position of the Sun. During daylight hours direct normal light from the Sun falls upon light sensors connected to the TCS. The TCS uses this data to determine the position of the Sun relative to the PV platform position and instructs the elevation and azimuth actuators to reposition the PV platform accordingly. In practice this results in very smooth tracking while using little of the valuable collected power. The monitoring and feedback system ensures a very high level of tracking accuracy ($\leq 0.1^\circ$) which is required to maintain the efficiency of the concentrator technology. The TCS automatically detects low light and cloud cover conditions in order to optimize the tracking efficiency throughout the day. It also monitors ambient environmental conditions and this data is used to initiate safe parking of the PV platform in high wind conditions.

Power Management System - Inverter (Optional)

The Power Management System (PMS) receives the DC power from the modules located on the PV platform and converts it to AC power for supply to the grid. The PMS ensures that the PV modules continue to operate at peak efficiency using a Maximum Power Point Tracking (MPPT) system. For safety purposes the PMS incorporates load monitoring and automatic circuit breakers which can detect overload and fault conditions.

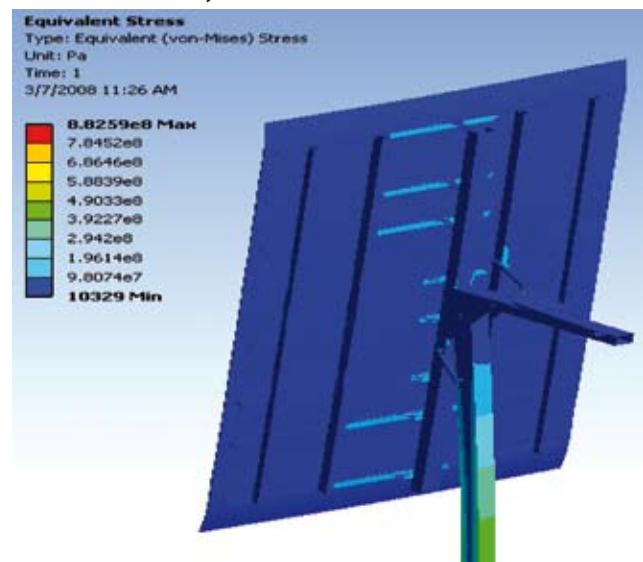
Physical structure

The Si-Trak is built from high quality galvanized steel which ensures strength and durability in all climates and environments. The focus of the design was efficiency, simplicity, ease of installation and operation. This has resulted in a very cost effective system which requires virtually no setup or initial alignment and can be fully operational in a single day.

When fully populated, the Si-Trak PV platform provides a collector area of 50m² and using the Si-Con 4X concentrator modules will provide a system that can deliver over 5KW of peak power.



Finite Element Analysis



Si-Trak 160

Technical Specifications

Si-Trak Analogue

Si-Trak Digital

	Si-Trak Analogue	Si-Trak Digital
Applications	Stand alone	Solar Park
Maximum Module area	50 m ²	50 m ²
Module Size cm (LxWxD)	102 x 102 x 21	102 x 102 x 21
No. of Modules	48	48
Azimuth Rotation angle	160° (-80° — +80° East to West)	160° (-80° — +80° East to West)
Elevation angle	0° - 80°	0° - 80°
East – West Drive	Twin linear actuators 24 VDC – 900 mm stroke length	Twin linear actuators 24 VDC – 900 mm stroke length
Elevation Drive	Linear actuator 24 VDC – 900mm stroke length	Linear actuator 24 VDC – 900mm stroke length
Tracking Accuracy	0.1°	0.1°
Mast height	4.9m	4.9m
Coupling to Foundation	Mast flanged at the base and screwed though bolts on to the reinforced concrete pad	Mast flanged at the base and screwed though bolts on to the reinforced concrete pad
Total Weight Excluding Modules	1800 kg (approximately)	1800 kg (approximately)
Positioning Control system	Position to follow the sun is achieved through a light sensing analogue controller	Position to follow the sun is achieved through a digital controller linked to central command system
Maximum Wind speed	Designed to withstand a maximum wind speed of 150 km/hr	Designed to withstand a maximum wind speed of 150 km/hr
Wind loading Protection	Shut to horizontal position in excessive wind conditions. Manual control to Park	Shut to horizontal position in excessive wind conditions. Central control to Park
Environmental Protection	The steel structural components are hot dip Zinc galvanised. Actuators and controls protected to IP65 standard.	The steel structural components are hot dip Zinc galvanised. Actuators and controls protected to IP65 standard.