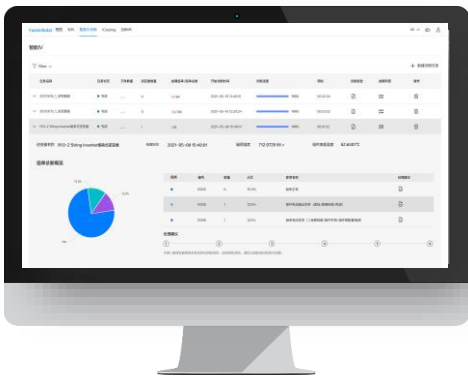# Smart I-V Curve Diagnosis

Smart I-V Curve Diagnosis is able to carry out online I-V curve analysis on entire strings with advanced diagnosis algorithm. The scanning would help to find out and identify the strings with low performance or malfunction, which would help to achieve proactive maintenance, higher O&M efficiency and lower operation cost.

Smart

Support plant-level, array-level and inverter-level analysis and diagnosis

Support scheduled scanning and proactive presentation of reports

Efficient

One-click scanning without onsite experts or equipment

Automatically identify different failure types and provide recovery suggestion

Support export of ROI estimation reports and assist in accurate O&M

Completing online I-V curve scanning on all strings of 100 MW plant within 20 minutes

Network Structure

One Click Scanning

Smart I-V Curve Diagnosis Report

SmartLogger

Smart PVMS

SmartLogger

Weather Station (optional)

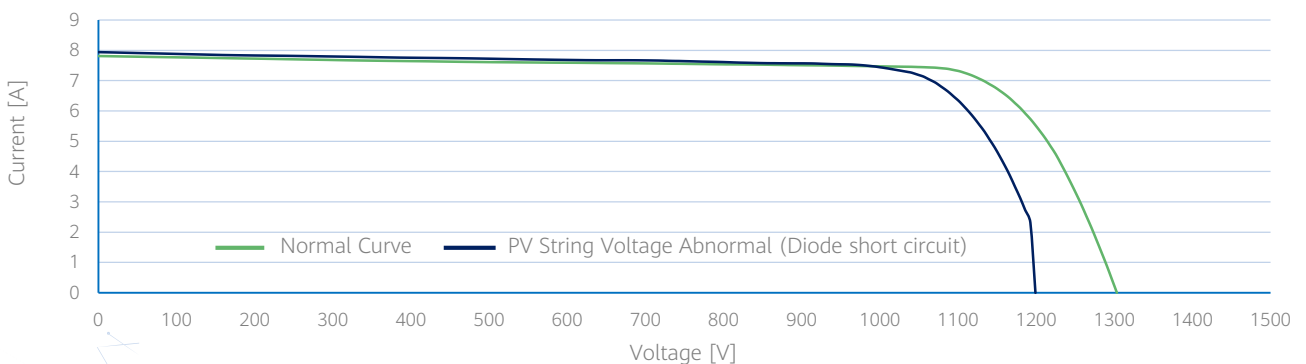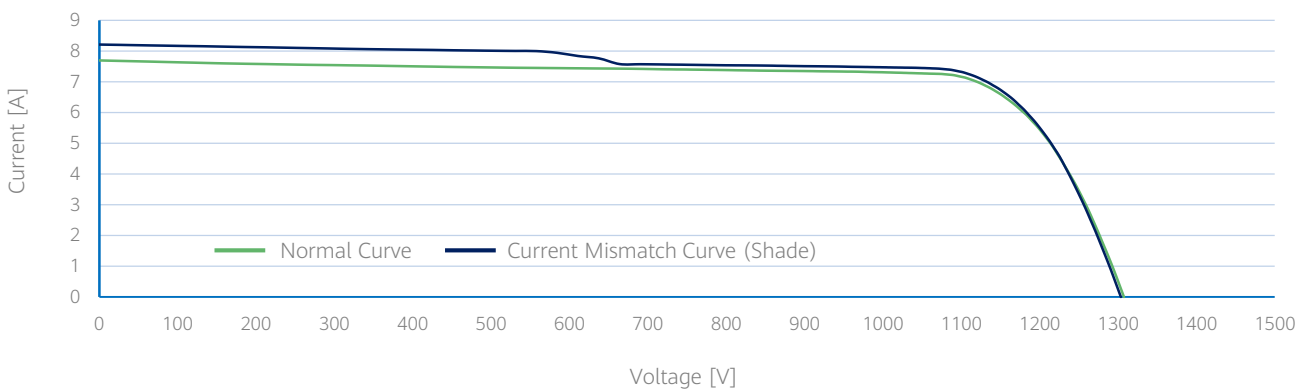SUN2000

Weather Station (optional)
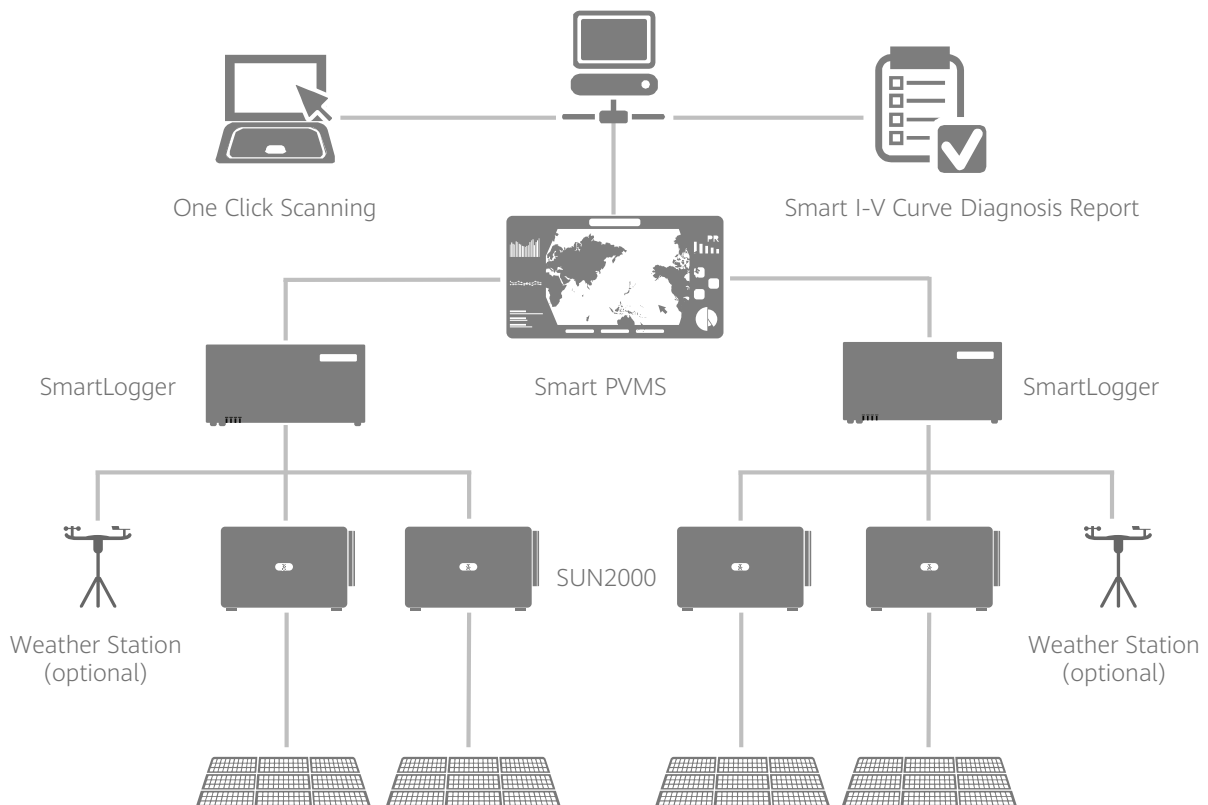
Smart I-V Curve Diagnosis

Technical Specifications

Smart String Inverter	SUN2000-215KTL-H0, SUN2000-215KTL-H3, SUN2000-185KTL-H1 ...
Data Logger	SmartLogger2000, SmartLogger3000
Management System	Smart PVMS
Scanning Time	< 1s per string
Sampling Points per I-V Curve	128
Voltage Accuracy	0.5%rdg. + 1dgt. (rdg.>5, dgt.= 0.3)
Current Accuracy	0.5%rdg. + 2dgt. (rdg.>0.3, dgt.= 0.006)

Smart I-V Curve Diagnosis Verified by TUV

| String-level Management	Smart I-V Curve Diagnosis
Real time monitoring	Fault Analysis
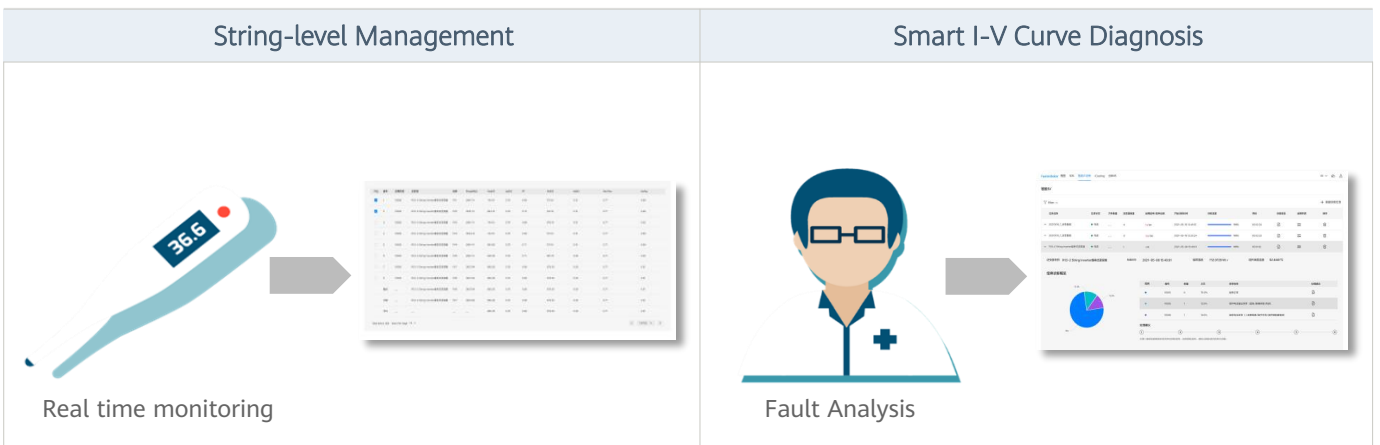
String I-V Curve Comparison

Smart Tracker Control Algorithm (SDS)

Smart Tracker Control Algorithm (SDS) is a valuable software of AI technology based and closed-loop control. By using the SDS, together with Smart PVMS, SmartLogger and SUN2000 inverters, the trackers' angle can be automatically controlled and optimally adjusted to achieve higher yields. The yields can be increased by ~1% especially in complex terrain and weather scenarios, and it will bring higher revenue to the customer.
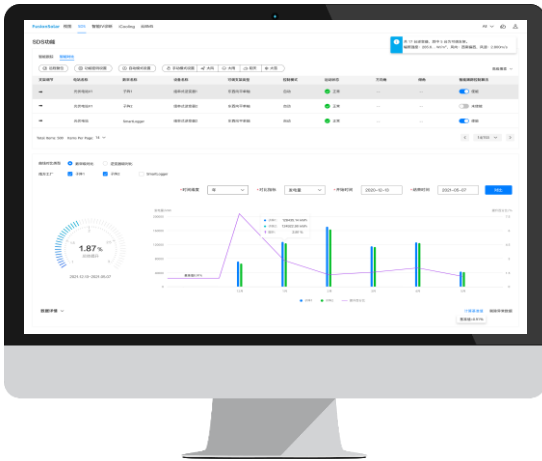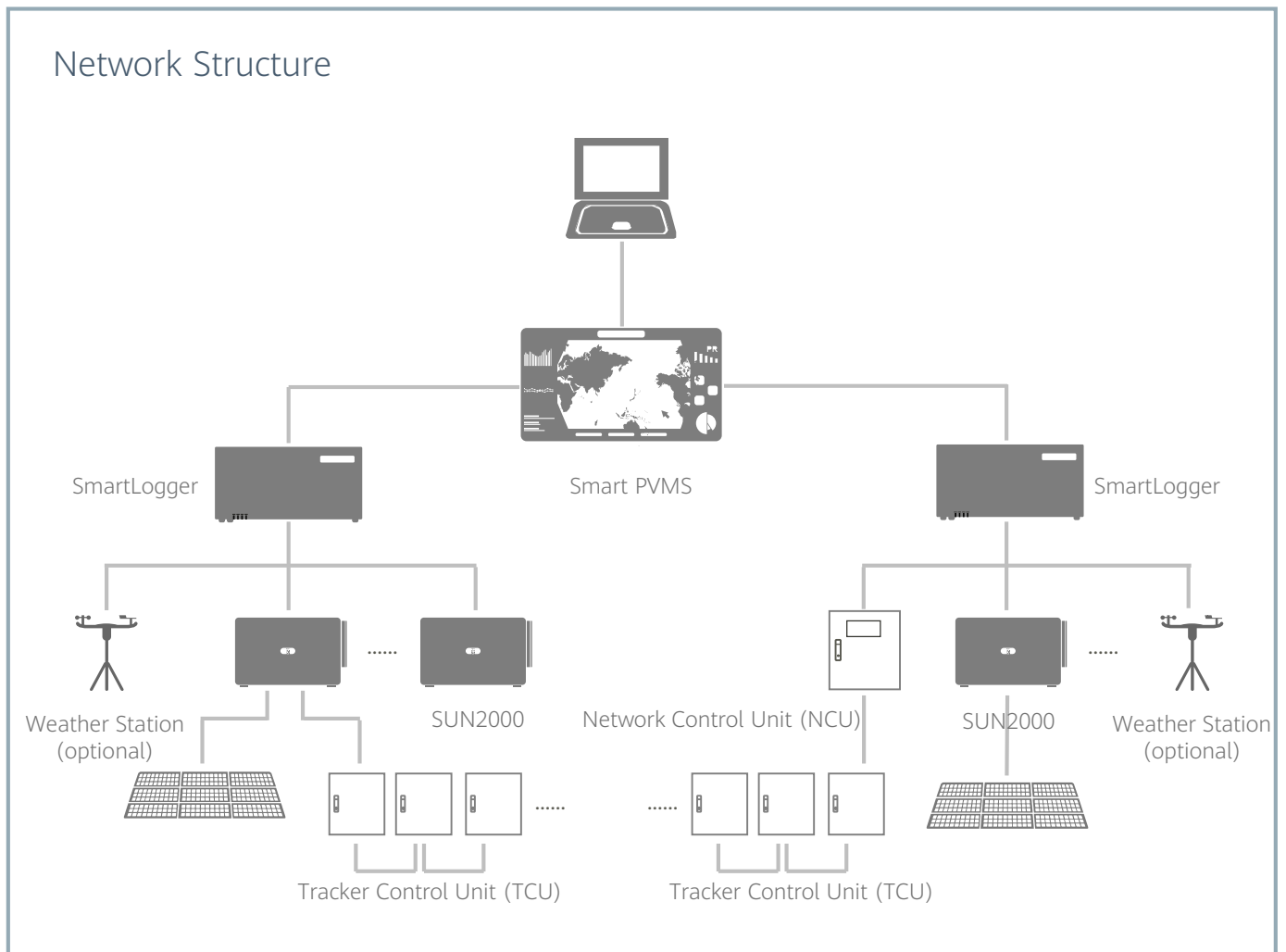

- System level closed-loop control to keep the system operating in the state of maximum irradiation and optimal power output of PV module

- Automatic tracking angle optimization and control by using AI technology, automatic sensing of shading and weather information. No need for additional sensing equipment, free from manual and empirical dependence
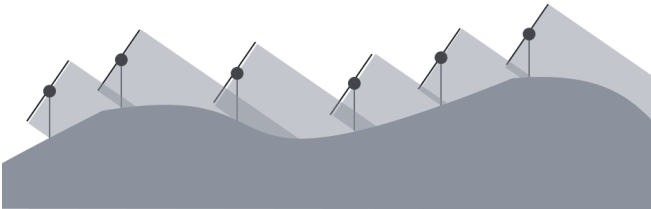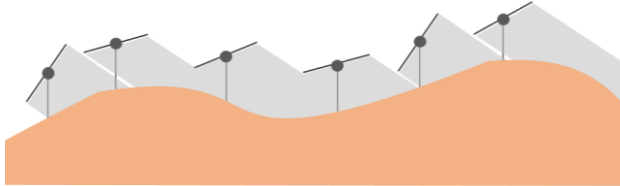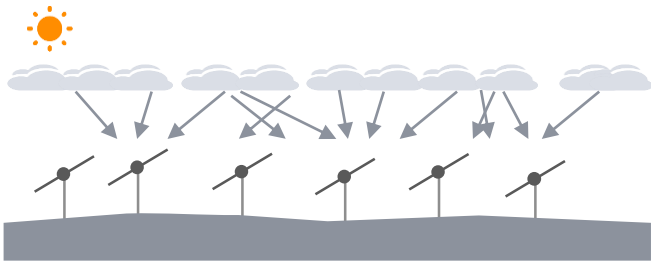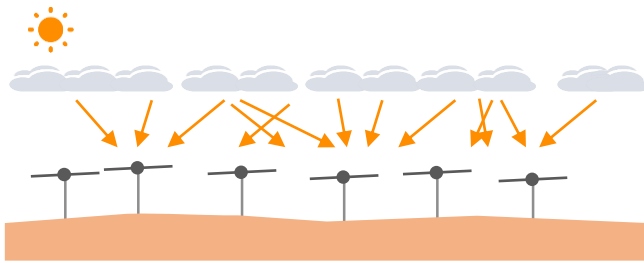
Network Structure

SmartLogger   Smart PVMS   SmartLogger

Weather Station (optional)   SUN2000   Network Control Unit (NCU)   SUN2000   Weather Station (optional)

Tracker Control Unit (TCU)   Tracker Control Unit (TCU)

Smart Tracker Control Algorithm (SDS)

Technical Specifications	
Smart String Inverter	SUN2000-215KTL-H0, SUN2000-215KTL-H3, SUN2000-185KTL-H1 ...
Data Logger	SmartLogger2000, SmartLogger3000 series
Management System	Smart PVMS
Tracking Angle Accuracy	0.5°
	Smart Tracker Control Algorithm Verified by TUV

Comparison of Tracker Algorithms and Angles

Reverse-tracking stage in the morning and at dusk

Shadows in the front and back rows of modules, without consideration of complex terrain	The SDS algorithm allows trackers to find the optimal angle for each, effectively avoiding shadow occlusions.
Traditional tracker algorithm	Smart Tracker Control Algorithm

Cloudy and rainy days

Tracking the angle of the sun is not the best way to get maximum irradiation when without consideration that direct sunlight becomes diffuse reflection in this scenario.	Trackers are flattened at a small angle to receive more diffuse light, so as to get maximum irradiation.
Traditional tracker algorithm	Smart Tracker Control Algorithm