Energy & Environment

Solution Ready Package

Solar Power Management Solution

Transforming Distributed Energy Resources to Drive the Growth of the Renewable Energy Market

- Centralized operation of unmanned remote sites
- Scalable architecture that works in plants of any size
- Analyze and optimize power station efficiency





System Introduction

Due to the ever-growing renewable energy industry, more solar power plants are planned for construction and operation worldwide. Current concerns among power plant owners and grid companies include data accuracy, operation efficiency, and asset management. Advantech's SPMS solution offers a unified monitoring management system, machine-to-intelligence technology, and a solid IoT data framework that can meet most managerial demands.

Industrial Apps

Distributed Solar Power Management System

- Decentralized control and centralized management
- Qualified for local regulations for seamless real-tir monitoring of station equipment



Distributed Solar Power Management System

e&e SPMS

Field Site Solar Power Management System

	Output Voltage	Output Current	Output Power	Solar Iradiance	•	Efficier	ray	Power Generation	•	Amount
CHHN Company	221.00 v	1.5 A	0.98 kW	0 kW/m	13 Ju	98.0)%	34 kW/	h	93 元
Current Time	Overall Temperature	Cooling Fin Temperature	C02 Concentration				Devices	Details		
2018-11-16										
16:17:28	55.00 °C	40.00°c	331.97 ppm	CHEIN Company						
10.17.20										
Output Power / Efficiency				CI-BIN Company						
15.0 kW										
10.0 kW	-15	4.4								
5.0 kW		man	50.0%							
0 kW 07:00 08:00	99:00 10:00 11:00	12:00 13:00 14:00	1500 1600							
			CHIHN Company							
				CIIIIN Company						
69.70	Overall / Cooling	in temperature								
50°C 40°C 30°C		mar	60°C 90°C 40°C 20°C							
		1200 1200 1400		sit 15 million						
07:00 08:00 - Cooling Fin Temperature Mirc 25 °C M			all Mix: 21 °C Mix: 61 °C Current: 55 °C							
- coord via rendenance milit za c a				CI-IN Company						
\$100	Earn	ng		CHIHN Company				Warning: Data lost.		
\$75 \$50 \$25										
50 07:00 08:00	09:00 10:00 11:00	12:00 13:00 14	100 15:00 16:00							
Earning Mirc \$0 Max \$93 Current \$1										

Real-time Equipment Status Monitoring

- Inverter details
- Earnings trend
- Efficiency trend chart

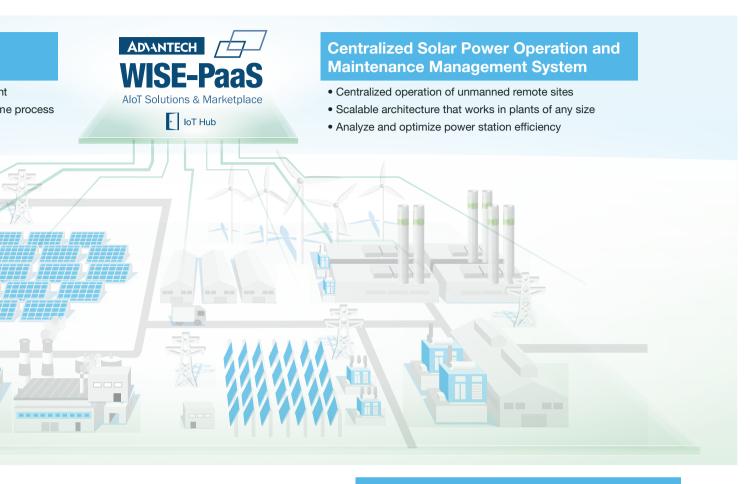


Distributed Sol Maintenance M



Station Overview

- Power generation information
- Overall output power/efficiency
- Power generation & amount statistics



ar Power Operation and Ianagement System



Centralized Solar Power Operation and Maintenance Management System



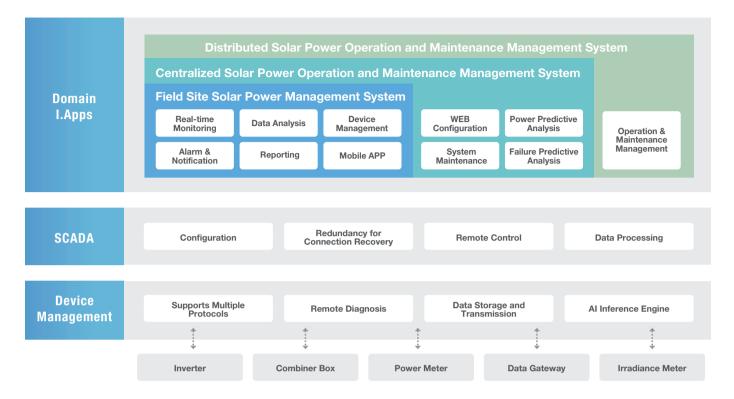
Centralized Solar Power Operation and Maintenance Management System

C18038-社师大塔他 Dubai So	lar / C18038 Home +					
			I Temperature Change			
Ourrent Time	Soloar Intellance	A/C Status (1: ON; 0: OFF)	Normal Glass House Total A/C Start-up Time Normal Glass House Today A/C S			
2019-03-19		• • • • • • • • • • • • • • • • • • •	41h 02h			
15:53:21		0	HISD Glass House Total A/C Start-up Time HISD Glass House Today A/C Star			
	800.0 W/m*	- ICPSI Normal Glass House Current: 0 - ICPSI HSG Glass House Current: 0	03h 41m			
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114.1 kWh			0.30 LW			
Ourrent Efficiency		10% 0% 10:00 11:00 12:00 13:00 14:00 15:00	0.10 kW 0.W1000 1100 1200 1300 1400 1500			
22.9%	0 W/m ⁸ 10:00 11:00 12:00 13:00 14:09 15:00 • ICPS, Bolow Imediance Current: 914.3 W/m ⁸	ICPSI. Northern Glass Current: 3.82% — ICPSI. Southern Glass Current: 17.16% ICPSI. Western Glass Current: 1.07% — ICPSI. Eastern Glass Current: 0% ICPSI. Too Glass Current: 0.97%	 – KCPSE Northern Glass Current: 0.04 kW – KCPSE Northern Glass Current: 0.18 kW – KCPSE Western Glass Current: 0.06 kW – KCPSE Too Glass Current: 0.27 kW – KCPSE Too Glass Current: 0.27 kW 			
Current Generation	Overall Power Information	Normal Glass House Power Information	HISG Glass House Power Information			
0.6 kW	Viellage Current Power Day (kNh) + Week (kNh) Models (kNh) 230.9 V 4.13 A -0.49 kW 5.04 kNh 18.99 kVh 259.40 kVh	Vottage Current Powar Day (kWh) Week (kWh) Month (kWh) 221.1 V 0.22 A 0.04 kW 2.82 kWh 11.02 kWh 146.24 kWh	Voltage Carrent Power Day (XWh) Week (XWh) Moeth (XWh) 221.1 V 0.22 A 0.04 kW 1.21 kWh 5.69 kWh 93.97 kWh			
V Normal Glass House Environment	tal Information					
	Glass Temperature	Indoor/Ouldoor Temperature	Indoor/Outdoor Hamidity			
		40.0 °C	100.0 NH 25.0 NH			
		20.0 °C	50.0 %H			
A/C Status Indoor	Temperature Indoor Hamidity Oxidoor Temperatur, Oxidoor Hamidity	10.0 °C	25.0 %H			
OFE 30	.0 °C 28.7 %H 33.5 °C 30.5 %H	10:00 11:00 12:00 13:00 14:00 15:00 - KCPSI. Indoor Temperature Current: 30:0 °C - KCPSI. Outdoor Temperature Current: 29:1 °C	10:00 11:00 12:00 12:00 14:00 15:00 - ICPSI, Indoor Humidity Current: 28:7 SH ICPSI, Outdoor Humidity Current: 30:5 SH			
HISG Glass House Environmental	Information					
	Glass Temperature	Indoor/Ouldoor Temperature	Indoor/Outdoor Humidity			
		40.0 °C				
		30.0 °C	40.0 %4			
	Temperature Indoor Humidity Outdoor Temperatu Outdoor Humidity	0 °C 19:00 11:00 12:00 13:00 14:00 15:00	20.0 MH 15:00 11:00 12:00 13:00 14:00 15:00			
OFF 29	.6 °C 36.5 %H 33.2 °C 38.1 %H	- KPSI. Indoor Temperature Current: 29.6 °C - KPSI. Outdoor Temperature Current: 28.8 °C	- ICP18, Indoor Humidity Current: 36.5 %H - ICP18, Outdoor Humidity Current: 38.1 %H			

Situation Room

- Solar irradiance
- Solar panel temperature and efficiency
- Power generation change chart
- Environmental monitoring

Software Diagram



System Diagram



Feature Highlights

Complete System Hierarchy

System designed according to the needs of the platform vendor, system vendor, and end user. Corresponds to industry standards and easily managed.

Situation Room Key Indicators

Each device has their own situation room icon, which can show critical events and give warnings.

Remote Control

The most common failure to solar energy systems are circuit breakers (CB) being tripped accidently. Therefore all CBs must have remote control support.

Application Stories

Building solar energy monitoring system for Dubai AI Maktoum International Airport

- End-to-end solution enables real-time monitoring in the solar glass facilities to effectively reduce carbon emissions and operational costs in a smart manner.
- The cloud server directly adjusts equipment temperature in response to local conditions, thereby maximizing energy efficiency.



Advantech edge data acquisition solutions improve real-time monitoring efficiency

- Real-time acquisition of data parameters including radiation, temperature, humidity, and wind direction.
- Central data management via Ethernet, Wi-Fi, RS-485, and/or a variety of other interfaces.
- Remote browser-based access optimizes equipment management efficiency.



Distributed solar power station monitoring system

- Locally qualified for seamless real-time process monitoring of station equipment.
- User-friendly data analysis interface ensures stable and reliable system operation.
- Easy maintenance with unified open-source management software.



Data acquisition solutions for distributed solar power stations

- Based on RISC-technology, industrial IoT gateways provide support for multiple network transmission protocols and are designed to ensure safe operation in harsh environments.
- Automatically resumes data transmission upon network reconnection to ensure data integrity and accuracy.
- Supports hundreds of communication protocols, compatible mainstream brands of inverters, combiner boxes, meters, and more.



Ordering Information

IoT PaaS Services



S WISE-PaaS VIP Membership

• PN: 98DPWAP2K - 2000 WISE points



WISE-PaaS/WISE.M+ Cloud-Based Monitoring & Operating Platform

• PN: 9803EE10000 - IIoT management platform for all industrial scenarios over the cloud platform

Field Site Solar Power Management System

 PN: SRP-SPMS-S30M - License which supports multiple solar stations and unlimited WebAccess/SCADA I/O tags



- PN: 310TDLSD0001A1 License for when the amount of gateways doesn't exceed 10
- PN: 310TDLSD0002A1 License for when the amount of gateways is between 11 and 20
 PN: 310TDLSD0005A1 - License for when
- the amount of gateways is between 21 and 50 • PN: 310TDLSD00E5A1 - Basic license which
- supports 50 gateways when the amount of gateways exceeds 50
- PN: 310TDLSD00A5A1 An additional license for every 10 gateways when the amount of gateways exceeds 50



Centralized Solar Power Operation and Maintenance Management System

- PN: 31OTDLSC0001A1 License for when the installed capacity doesn't exceed 10MW
- PN: 310TDLSC00E1A1 A basic license which supports 10MW when the installed capacity exceeds 10 WM but less than 100WM
- PN: 310TDLSC00A1A1 An additional license for every 10MW when the installed capacity exceeds 10 WM but is less than 100WM
- PN: 310TDLSC00EHA1 A basic license which supports 100WM when the installed capacity exceeds 100MW
- PN: 31OTDLSC00AHA1 An additional license for every 100MW when the installed capacity exceeds 100MW

Distributed Solar Power Data Acquisition



Cloud-Enabled Equipment Protocol Gateway

 PN: ESRP-PCS-ECU1251 - TI Cortex A8 industrial communication gateway with 2 x LAN, 4 x COM ports, 4G SD card and WISE-PaaS/EdgeLink



Cloud-Enabled Equipment Protocol Gateway

 PN: ESRP-PCS-ECU1051 - TI Cortex A8 industrial communication gateway with 2 x LAN, 2x COM ports, 4G SD card and WISE-PaaS/EdgeLink



Wireless Intelligent Remote Terminal Unit

 PN: ESRP-PCS-ADAM3600 - ARM Cortex A8 wireless intelligent RTU with 8AI, 8DI, 4DO, 4-Slot expansion, 4G SD card and WISE-PaaS/EdgeLink



Basic Consulting Services

• PN: 9803EECS010 - 15 WISE points







• PN: 9803EECS100 - 120 WISE points



Advanced Consulting Services

• PN: 9803EECS01K - 1200 WISE points

Advantech Headquarters

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Enabling an Intelligent Planet

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WISE-PaaS Marketplace