

N8900APV 1500V Photovoltaic Array Simulators and SAS Control Software

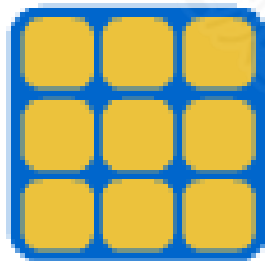
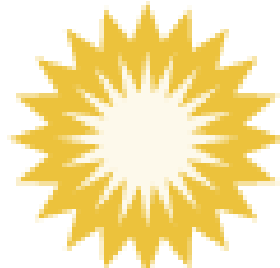
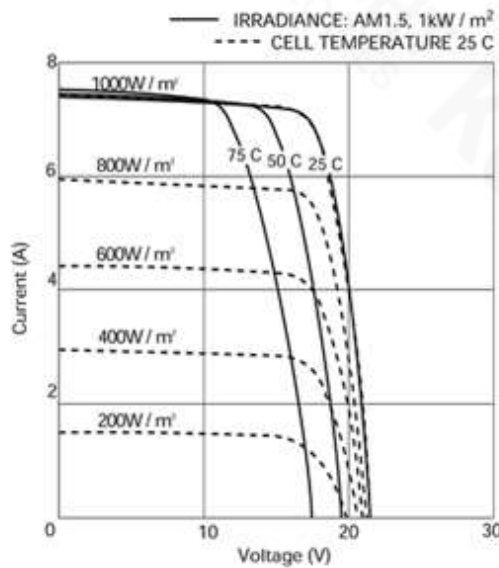
May 2016



N8957APV PV Array Simulator

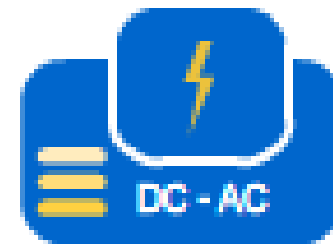
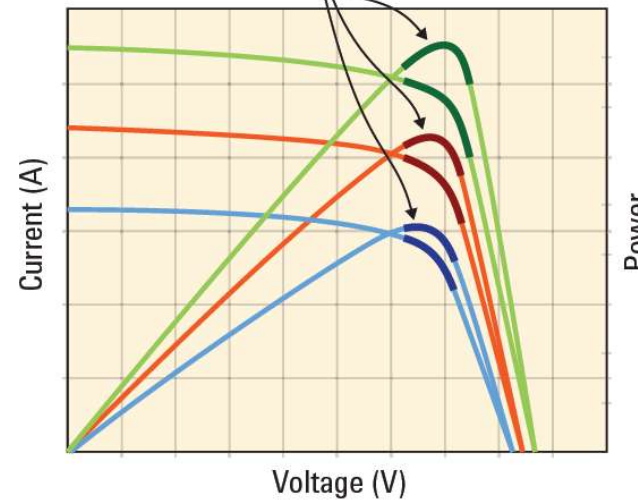
Test Maximum Power Point Tracking (MPPT) in solar inverters

Solar panel IV Curves



1. Solar panels

Inverter MPPT

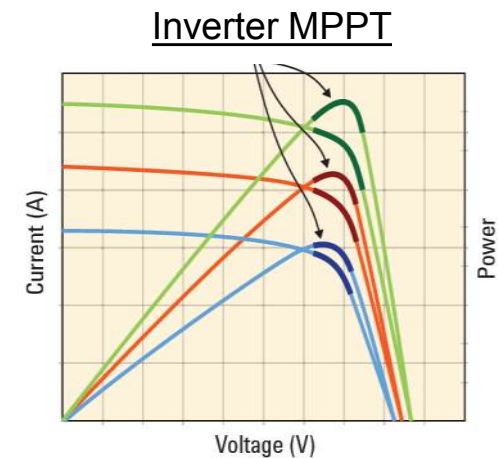


2. Inverter

N8957APV PV Array Simulator

Solar Inverter Testing

- **Develop and verify** the performance of inverter **peak power tracking algorithms** and circuits
- **Measure inverter power conversion efficiency** over a variety of simulated conditions (varying temperature and irradiance).
- Verify the ability of the inverter to produce grid level power from low to high voltage extremes.
- Perform **qualification tests** – confirm inverter performance during or after exposure to varying environmental conditions.
- Perform **accelerated lifecycle tests**
- Perform **certification tests**



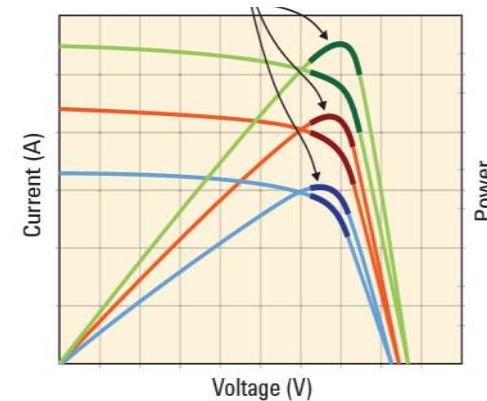
N8957APV PV Array Simulator

Product Overview

- 15 kW ($1500V_{dc}$, 30A) in 3 RU Chassis
- Parallel supplies up to 150 kW
- $400V_{ac}$ input
- PC based SaS Control software
 - Three Curve Generation modes:
EN50530, Sandia, N8900
 - Run time instrument control including scaling for changes in temperature (V) and Irradiance (I)
- Ideal for both Design Verification and Automated Test in production



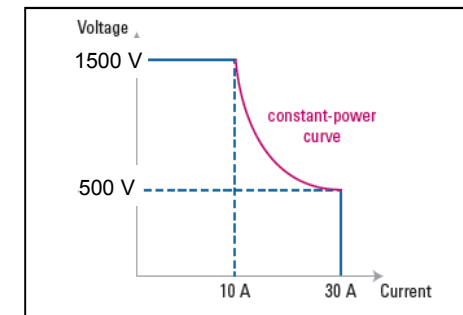
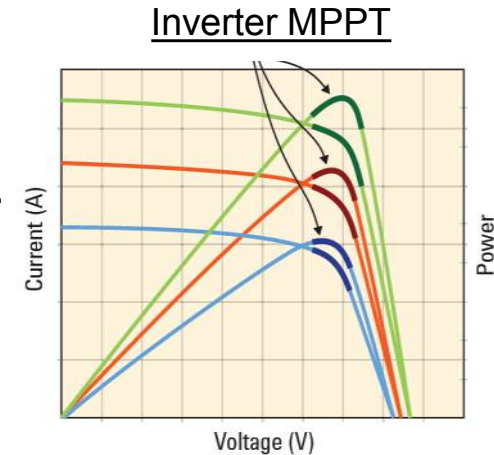
Inverter MPPT



N8937/57APV PV Array Simulator

Key Features

- **Unique 1500V_{dc} output** & 1000V_{dc} isolation voltage:
 - Ready for **emerging solar power plant technologies**.
 - Enables testing to higher solar inverter input voltages
- **Auto-ranging:**
 - **Minimizes capital equipment investment**, providing continuous V/I combinations (1500V/10A to 500V/30A)
- **Compact Power Supply:**
 - **Minimizes rack space** and simplifies wiring
 - Available in **pre-wired rack** for up to 90kW of auto-ranging power and PV array simulation



SaS Control SW Version 1.0

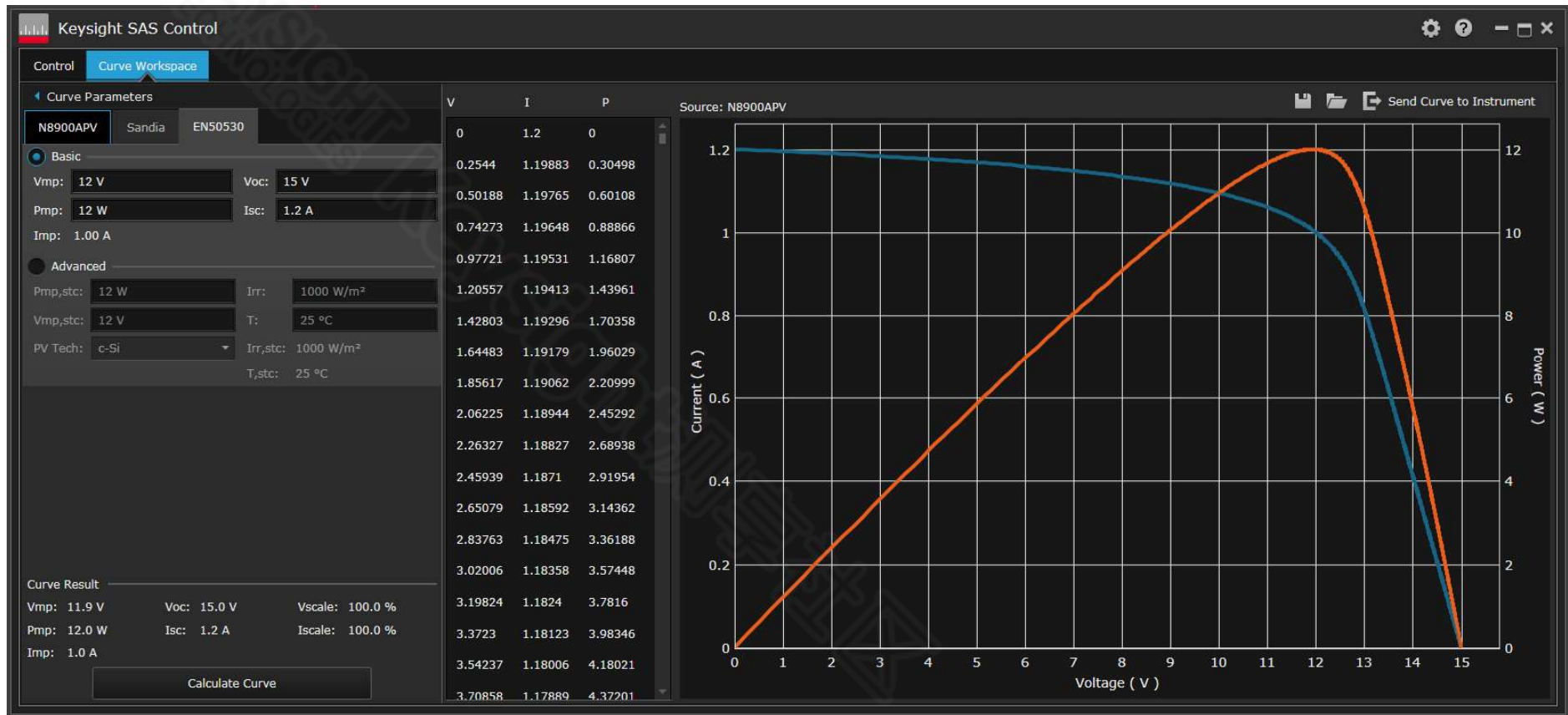
Page

- Simulate IV curves
- Visualize operating points and instantaneous measurements
- Perform simple scaling (V & I percentage)
- Perform advanced scaling (Temperature and Irradiance)
- Change and control various settings on the N8900APV array simulator instrument

SAS Control Software

Quickly and Easily Generate I-V and Power Curves

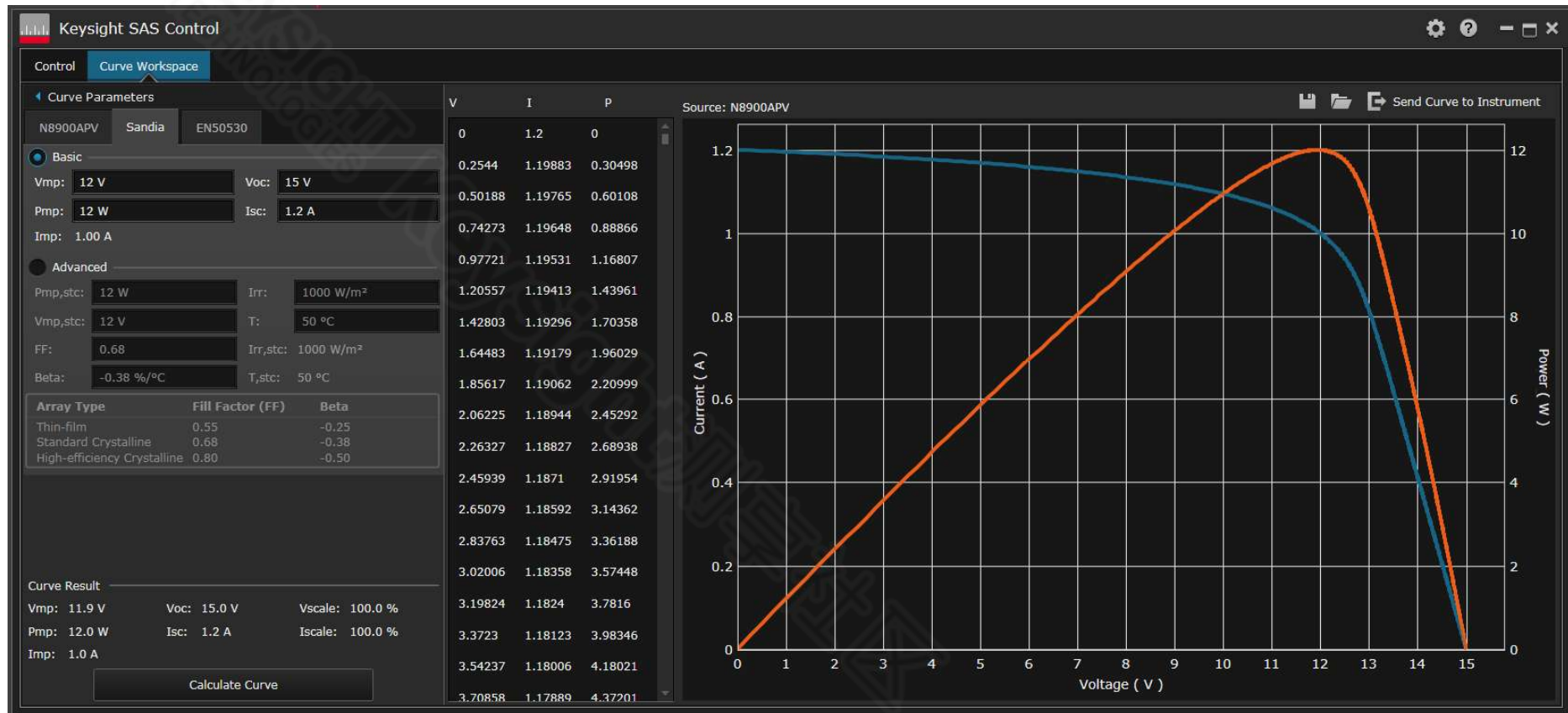
EN50530



SAS Control Software

Quickly and Easily Generate I-V and Power Curves

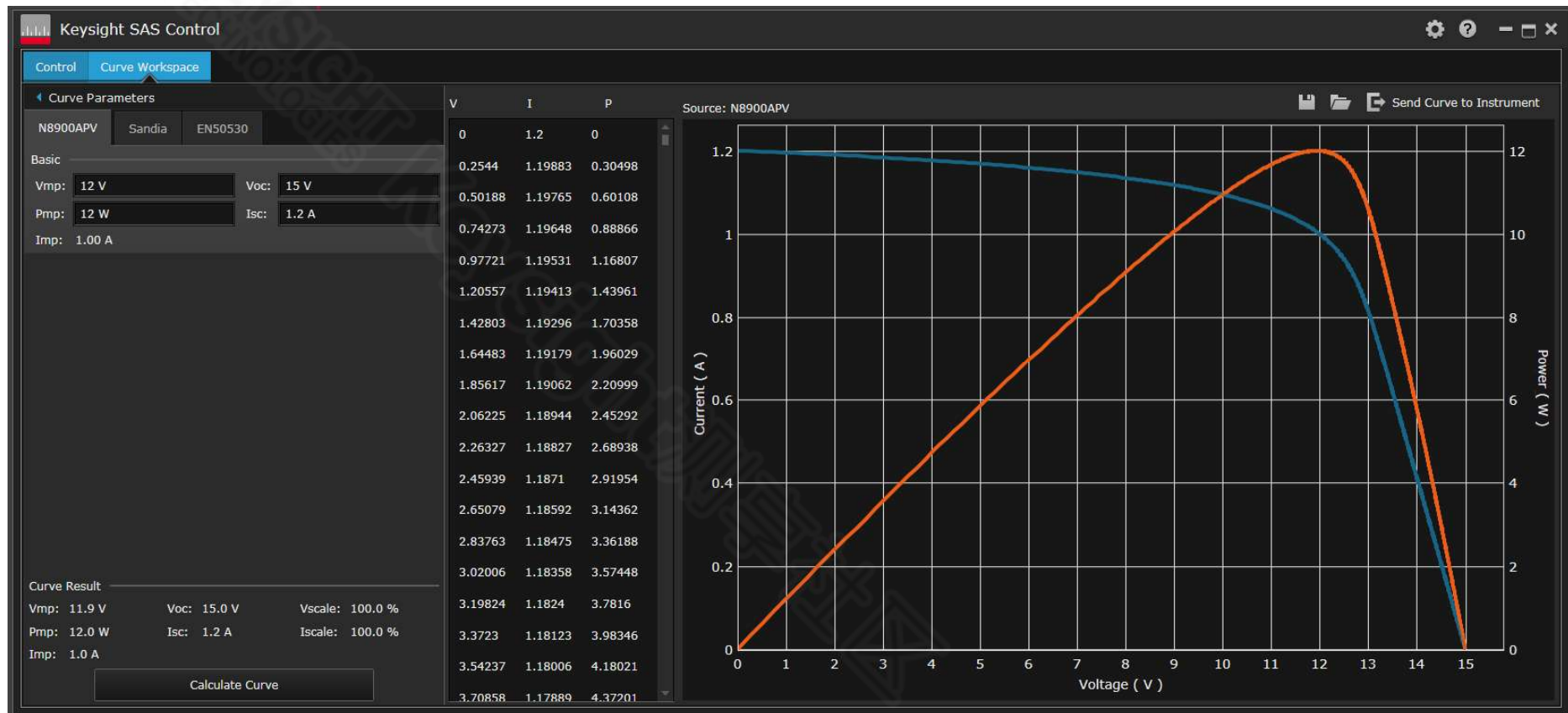
Sandia



SAS Control Software

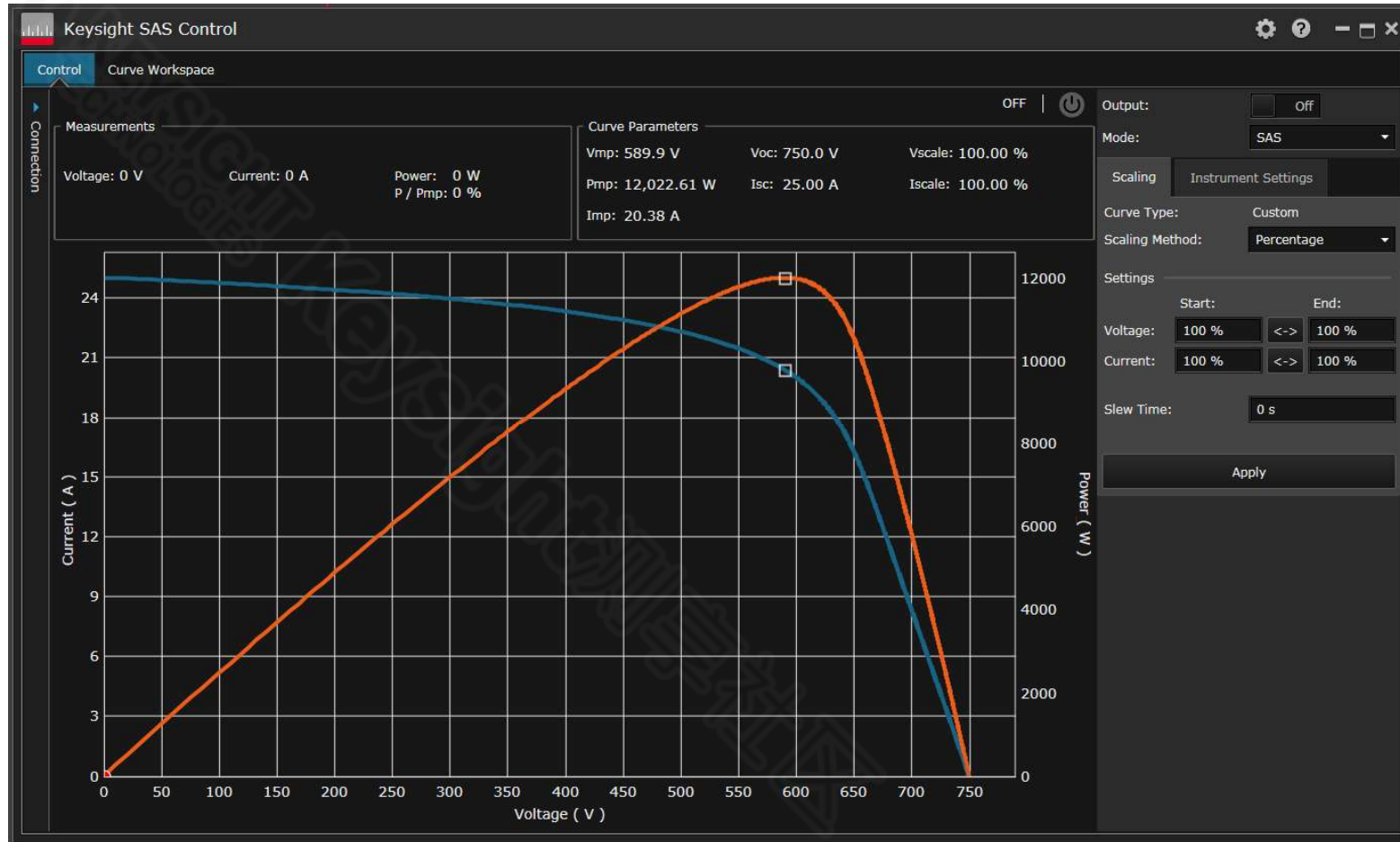
Quickly and Easily Generate I-V and Power Curves

N8900APV



SAS Control Software

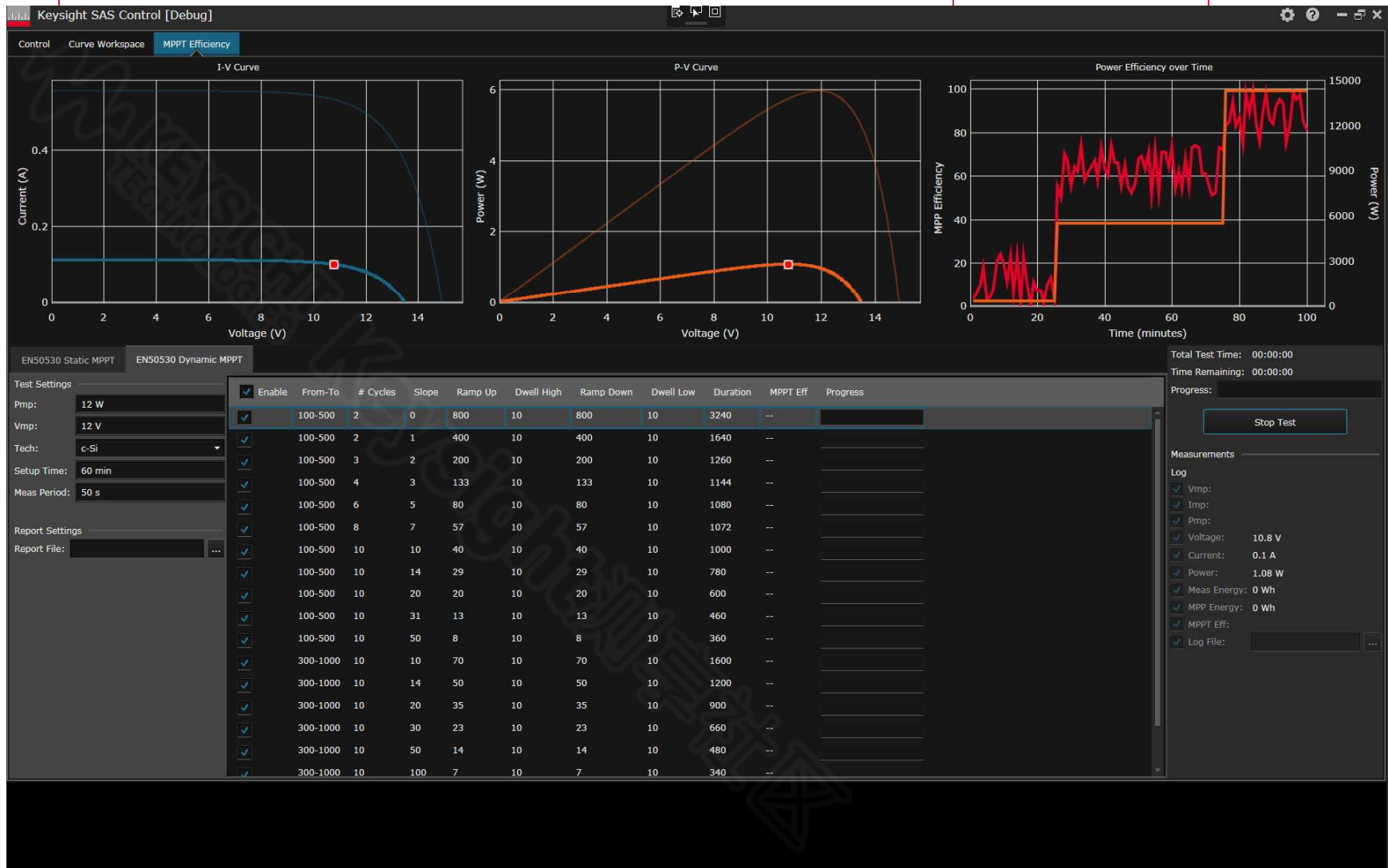
Instrument Control



Version 2.0

Page

- Execute Static and Dynamic EN50530 standard tests
 - Generate test reports for both tests
 - Log measurements over the duration of the tests
 - Visualize power and power efficiency over time during the tests
 - Select which EN50530 test steps to run
- Inverter connection verification
 - Quickly runs through a test to verify the array simulator is correctly connected and the inverter is functioning properly



SAS Control

Control Workspace MPPT Efficiency

V-I Curve

V-P Curve

Power and Efficiency Over Time

EN50530 Static MPPT EN50530 Dynamic MPPT

Enable	From-To	# Cycles	Slope	Ramp Up	Dwell High	Ramp Down	Dwell Low	Duration	MPPT Eff
<input checked="" type="checkbox"/>	100-500	2	0.5	800	10	800	10	3540	99%
<input checked="" type="checkbox"/>	100-500	2	1	400	10	400	10	1940	
<input type="checkbox"/>	100-500	3	2	200	10	200	10	1560	

Test Settings

Pmp:

Vmp:

Tech:

Setup time:

Meas period:

Report Settings

Report file:

Total test time:

Time remaining:

Status: In Progress

Progress:

Measurements

Log

Voltage:

Current:

Power:

Meas Energy:

MPP Energy:

MPPT Eff:

Log file:

SAS Control

Control Workspace MPPT Efficiency

V-I Curve

V-P Curve

Power and Efficiency Over Time

EN50530 Static MPPT EN50530 Dynamic MPPT

Vmp	5%	10%	20%	25%	30%	50%	75%	100%
800 V								
700 V								
600 V								

Test Settings

Pmp:

Vmp,max:

Vmp,nom:

Vmp,min:

Tech:

Setup time:

Meas period:

Report Settings

Report file:

Total test time:

Time remaining:

Status: In Progress

Progress:

Measurements

Log

Voltage:

Current:

Power:

Meas Energy:

MPP Energy:

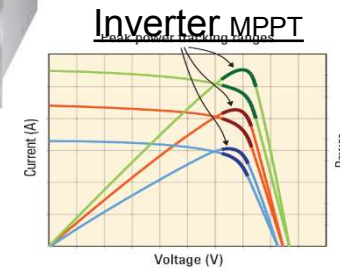
MPPT Eff:

Log file:

N8957APV PV Array Simulator

Summary

- 15 kW (1500V, 30A) in 3 RU Chassis
- Parallel supplies up to 150 kW
- Curve & Table PV Simulation Modes
- PC-Based Software
- 400V_{ac} and 208V_{ac} input



- ❖ Maximize your inverter's energy production / power conversion
- ❖ Automate complex MPPT testing to minimize Design Verification test time and resources
- ❖ Auto-ranging supply allows maximum versatility in your lab and production

Thank you

Questions?

