ITECH

YOUR POWER TESTING SOLUTION

## Product

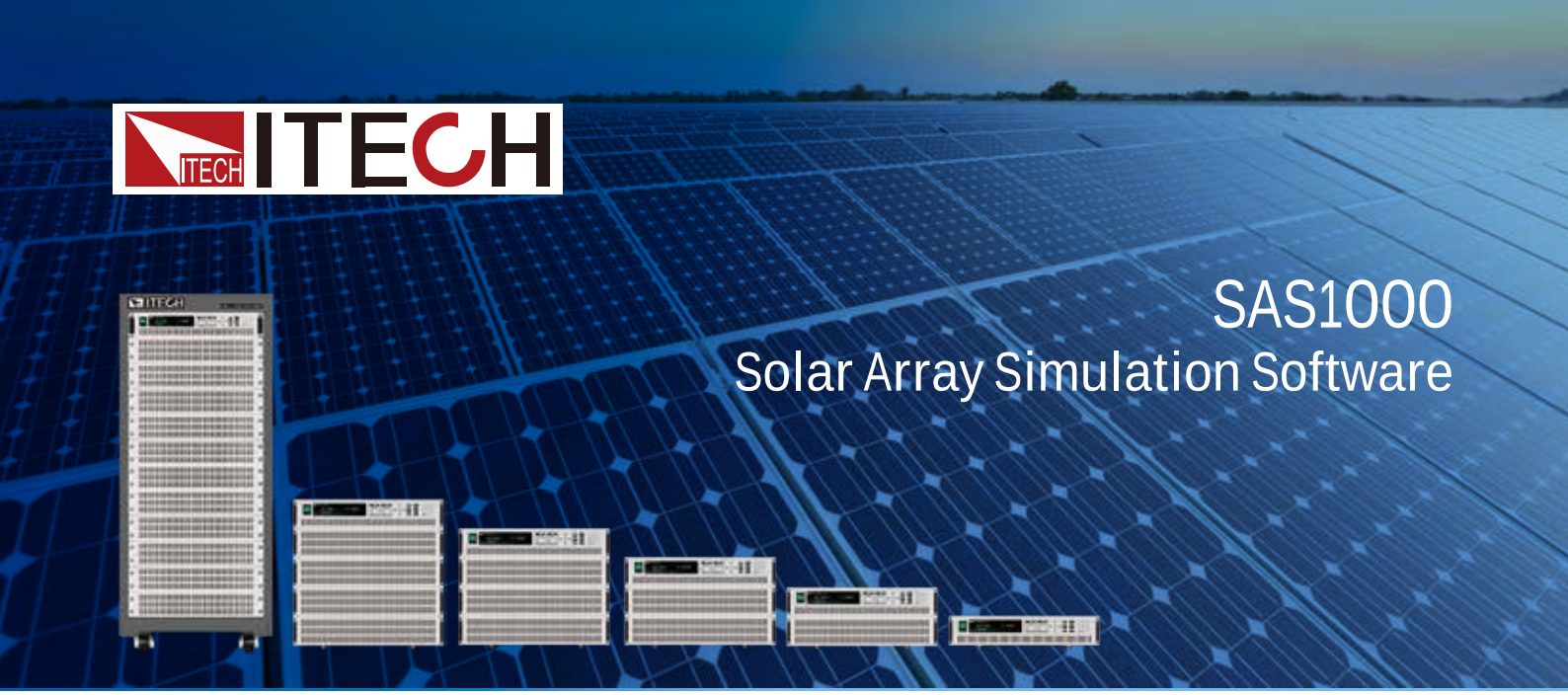
ITECH high speed high performance photovoltaic / solar array simulator power supply

## Application fields

Solar array simulation  Photovoltaic inverter  Micro inverters and solar chargers

# SAS1000 Solar Array Simulation Software

*Your Power Testing Solution*



# SAS1000
## Solar Array Simulation Software

ITECH latest SAS1000 solar array simulation software, combined with high performance high power DC power supply, can accurately simulate solar array I-V curve. It has the characteristics of accurate measurement, high stability and fast response speed, etc. With the built-in EN50530 / Sandia / NB/T32004 / CGC/GF004 / CGC/GF035 SAS module, the solar array simulator enables easy programming on test regulations, materials, Vmp, Pmp parameters, so as to simulate I-V curve characteristic output and generate reports. These benefit much in test of the static & dynamic maximum power tracking performance of photovoltaic inverters.

ITECH SAS1000 solar array simulation software also provide Shadow and Table mode. The shadow mode is provided to allow users to edit any shielded I-V curves for dynamic shadow. Under Table mode, the user can select 4096 points matrix, or store 100 I-V curves of different temperature and irradiation in the memory, and can set the implementation sequence and time of each curve, to test the long-term MPPT performance evaluation under different climates. SAS1000M is also available for multi-channel MPPT testing. The solar panel output simulation under the 24-hour real environmental parameters is also available. As a solar simulator, our power supply also provides supports for micro-grid, distributed photovoltaic etc power system simulation and core equipments testing.

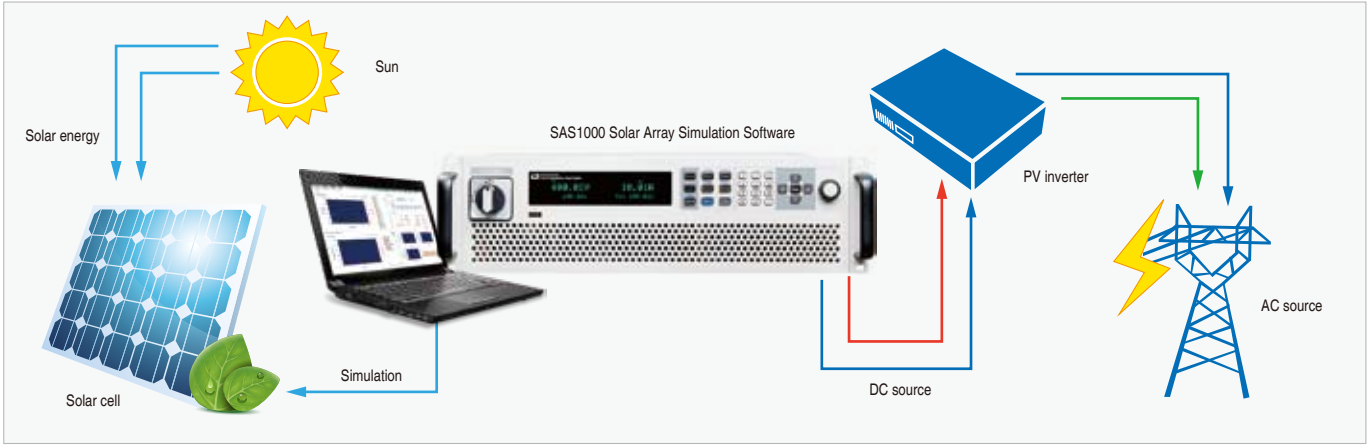
## Features

- Automatic wide range output, the voltage up to 2250V
- Power up to 1152kW
- Support up to 20 solar cell power supplies for multi-channel MPPT testing *1
- Solar array simulate I-V function (Built-in I-V curve mathematical formula)
- Simulate the output characteristics of various solar cell (monocrystalline silicon cell, polysilicon cell, thin film cell) (Fill Factor)
- Simulate I-V curve under different temperature and irradiation
- Simulate I-V curve for solar panel under shadow
- Static & dynamic MPPT efficiency test
- Built-in EN50530 / Sandia / NB/T32004 / CGC/GF004 / CGC/GF035 test program, and generate reports
- Graphical software interface, real-time test and display
- MPPT state of PV inverter
- Auto program control 100 I-V curves via Vm, Pm, FF, materials, regulations and other parameter points
- 100 * 128 points curves and 4096 points precise programming control *2
- Support pre-program multiple IV curves（Vmp, Imp, Voc, Isc）and switch online *3
- List Mode New

*1: Only applicable for SAS1000M
*2: IT-M3600 supports 10 curves and 1024 points control under Table Mode
*3: Not applicable for IT6500C

## Applications

- Design & verify the MPPT circuit and algorithm of the PV inverter
- Verify the MPP voltage range and the full load MPP voltage range of the inverter
- Verify static maximum power tracking efficiency of the PV inverter
- Verify the MPPT performance of the inverter for dynamic curves (Built-in EN50530,Sandia,NB/T32004,CGC/GF004, CGC/GF035)
- Verify the inverter starting voltage and the maximum input voltage, the maximum input current and other electrical parameters
- Verify the MPPT mechanism of the inverter for the I-V curve when the solar cell is shaded by clouds or trees.
- Test inverter DC terminal OVP, OPP
- Verify micro-grid control center and control function of photovoltaic energy storage system
- Verify the MPPT performance of the inverter from early morning to nightfall
- Verify the total efficiency and conversion efficiency of the inverter with IT9100 power analyzer




## Model table

| | |
|---|---|
| SAS1000 | Suitable for IT6000C series, IT6000B series, IT6500C series, IT-M3600 series |
| SAS1000L | Suitable for IT6000C, IT6000B, IT6500C and IT-M3600 series with power ≤15KW |
| SAS1000M | Multi-channel version, support up to 20 solar cell power supplies for multi-channel MPPT testing |

* For higher power test, please contact ITECH.

## Applicable model list

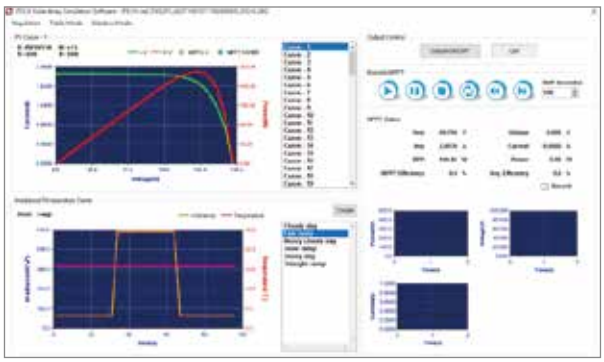
| Series | Product Name | Specification |
|---|---|---|
| IT6000C | Bidirectional Programmable DC Power Supply | 80~2250V / 5~1152kW |
| IT6000B | Regenerative Power System | 80~2250V / 5~1152kW |
| IT6500C | Wide-range High-power DC Power Supply | 80~1000V / 3~6kW |
| IT-M3600 | Regenerative Power System | 60~600V / 200W~800W |
| IT-M3900C SAS | Bidirectional Programmable DC Power Supply | 85V / 2kW~6kW |

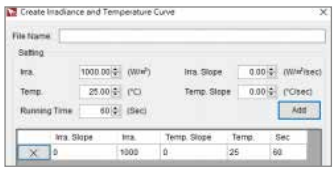
# Your Power Testing Solution

## SAS1000 Solar Array Simulation Software

## Simulate the output characteristics of various solar cell (FILL FACTOR)

Since solar cell utilization is not only related to its internal characteristics, but also related to weather, season, temperature, irradiation, cloud cover, rain and snow and other factors, solar cell has different I-V characteristics in different periods. Therefore, PV inverter must have a strategy to adjust real-time working point of the solar cell to make it always work in the vicinity of the maximum power point, this process is called MPPT. SAS1000 solar array simulation software can be used to directly simulate various real-life solar cell arrays in a laboratory test environment to test the static & dynamic MPPT performance of photovoltaic inverters.






Set dwell time for each I-V curve to track MPPT and efficiency.

Easy to edit, save 1 - 100 I-V curves

SAS1000 solar array simulation software newly supports pre-program multiple IV curves（Vmp, Imp, Voc, Isc）and switch online function. During the software operation, users can also dynamically adjust the parameters of Voc, Vmp, Isc, Imp, illuminance and temperature curve. The curve will be adjusted in real time according to the new parameters, making the test more accurate.

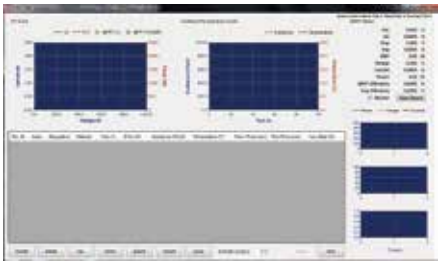
## Graphical software interface

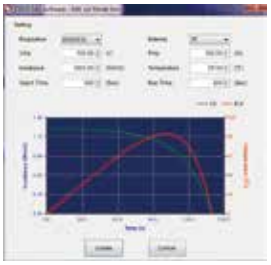
SAS1000 solar array simulation software has graphical software interface, users can easily use the software to output, measure, display the maximum power tracking status of photovoltaic inverter in real time and record value. Built-in EN50530, Sandia, NB/T32004, CGC/GF004, CGC/GF035 five kinds of regulatory testing procedures, it is convenient for users to test the static and dynamic MPPT performance of PV inverters and generate reports, so as to compare with competitors' results. Solar simulator power supply also provides the shadow, table and List mode, the user can enter the 128 ~ 4096 points array to edit any shielded I-V curve to achieve dynamic shadow effect and also can store 100 I-V curves under different irradiation and temperature to test the long-term maximum power tracking performance of photovoltaic inverters under different climatic conditions.

SAS Mode | Table Mode | Shadow Mode | List Mode

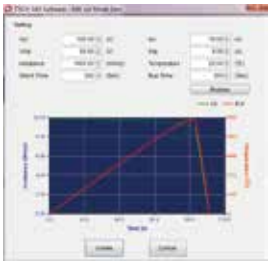
## List Mode

SAS1000 solar array simulation software provides List mode, users can freely choose whether to simulate the curve by setting the Voc, Vmp, Isc, Imp or regulations, and then combine the different curves and run them in sequence.





Curve Mode

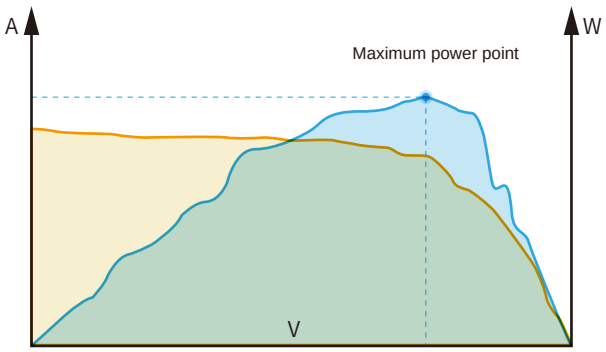


UserDefine Mode

## Static & Dynamic MPPT performance test

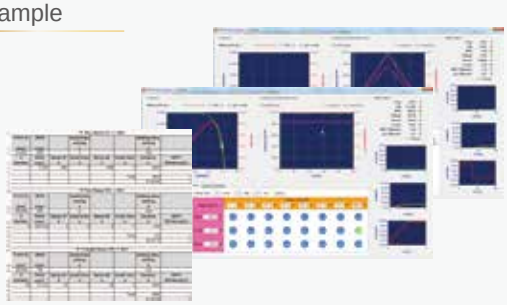
MPPT tracking performance is a very important specification of PV inverter, PV inverter needs a built-in MPPT mechanism to track real-time maximum output power of solar cell. Therefore, some of the industry's organizations have defined some "standard" test patterns to match all kinds of inverters, which allows inverter manufacturers to test and improve MPPT performance. Build-in MPPT test program of EN50530, Sandia, NB/T32004, CGC/GF004, CGC/GF035, users can set their own Vmp, Pmp, materials and other parameters, test run time and maximum run power percentage, the I-V curve and the real-time trace process are displayed on the screen to verify MPPT performance of the PV inverter, record the data during the whole test and generate report.

Test the MPPT performance of PV inverter by easy programming illumination intensity with time



Test example

Sandia



Test example

EN50530

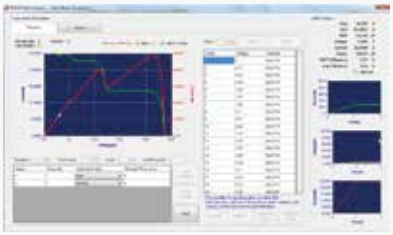
# Your Power Testing Solution

## SAS1000 Solar Array Simulation Software

## Automatic program（Table Mode）

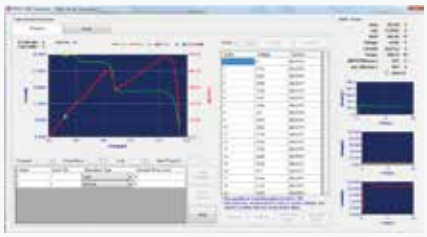
Table Mode of SAS1000 solar array simulation software can facilitate users to quickly verify the MPPT performance of photovoltaic inverter in the R & D and quality testing. Users can define 100 curves which has 128 points on each curve, after selecting the Curve, Loop, Next program and other necessary information, the software can be test by the setting steps, report will be automatically generated after finished.

### Table Program Test example



1 Run the first curve of the first program

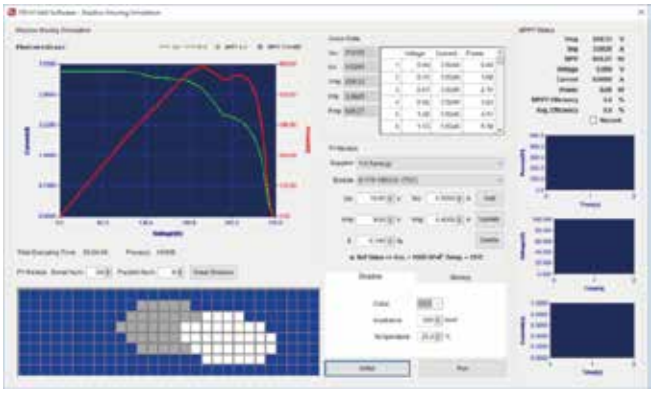
2 Run the second curve of the first program after 5s



3 Clicking next, run the first curve of next program

## Shield I-V curve simulation（Shadow Mode）

SAS1000 solar array simulation software can help users to complete the solar array output simulation under different shadow modes, test and track real-time maximum power and performance test of the PV array. Providing various Module for the user to choose according to different supplier, users can also build their own PV module.  User can define irradiation and temperature parameters of shadow, cell string set, parallel quantity and dynamic shielding the moving direction of the cloud, initialization time, running time and the time interval of cloud moving.



Select the moving direction of the cloud, initialization time, running time and the time interval of cloud moving

Set the irradiation and temperature parameters of clouds

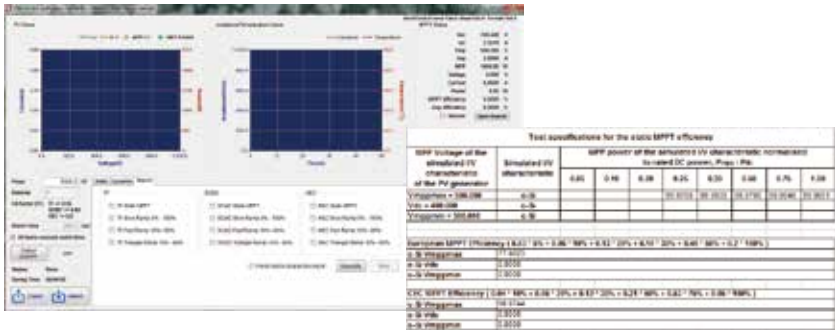
## Inverter conversion efficiency test

SAS1000 solar array simulation software is with built-in regulations EN50530, Sandia, NB/T32004, CGC/GF004, CGC/GF035 PV IV curve model, users can equip with IT9100 power meter to test conversion efficiency of photovoltaic inverter according to the maximum power percentage value.

IT9121 Power Meter

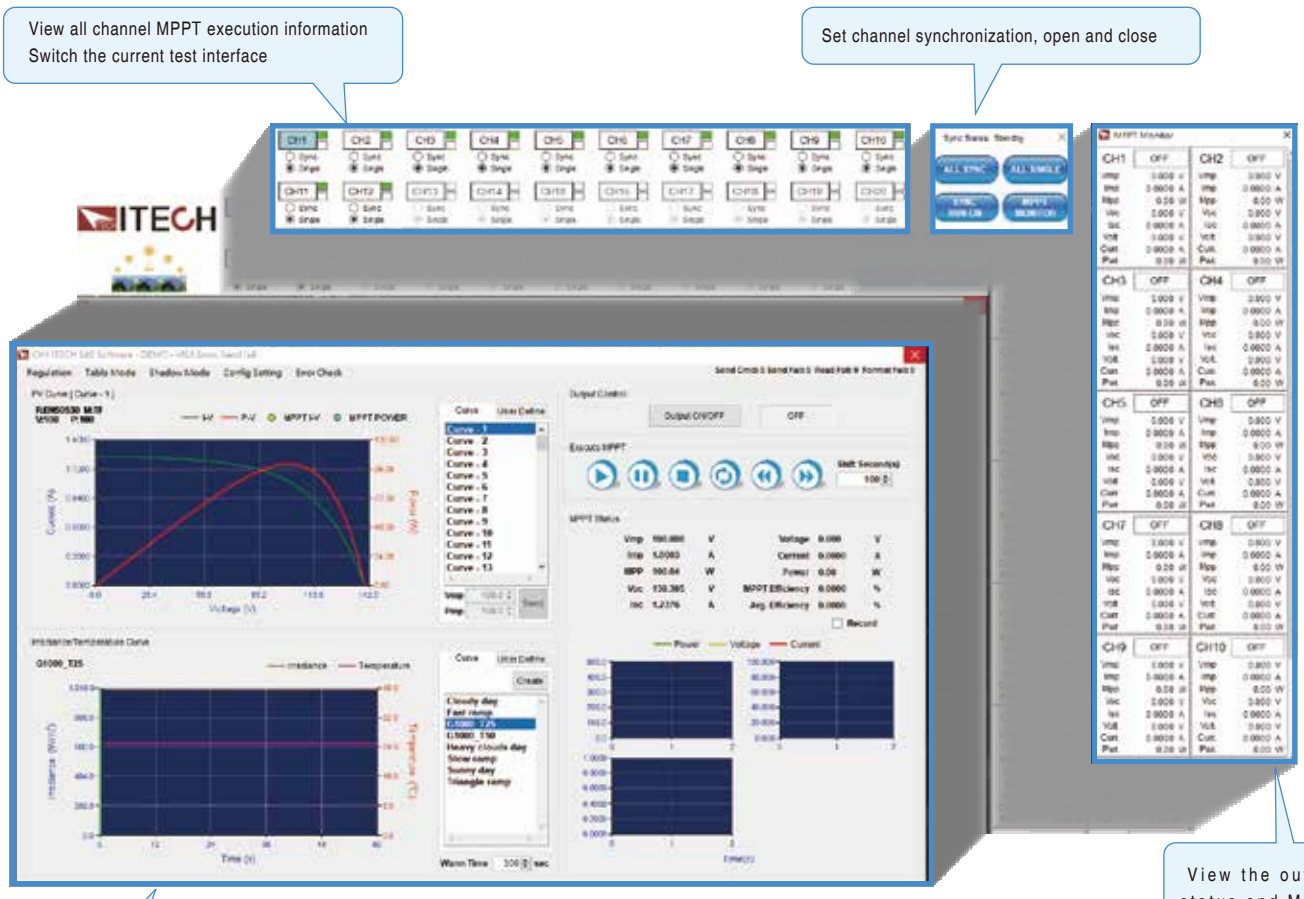
## Report generation

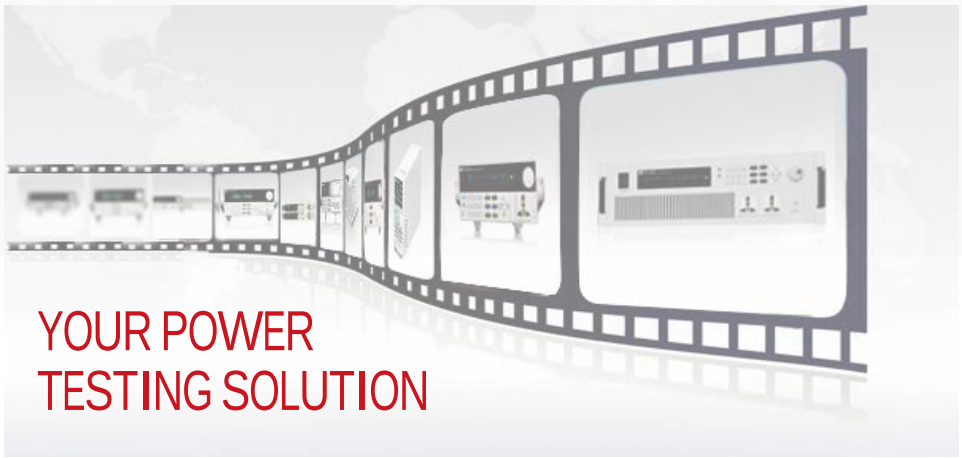
SAS1000 solar array simulation software allows users to record the measured parameters, such as voltage, current, power, watts, MPPT efficiency , sampling time interval and total length of time, etc., which facilitates the analysis of PV inverter.



## Multi-channel MPPT Test

SAS1000M multi-channel solar array simulation software supports up to 20 channels MPPT test, users can not only choose whether to perform single-channel test or multi-channel synchronous test. At the same time, users can also choose to copy the setting of one channel to several or all channels, which provides maximum flexibility for users to facilitate users to complete multi-channel testing.





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