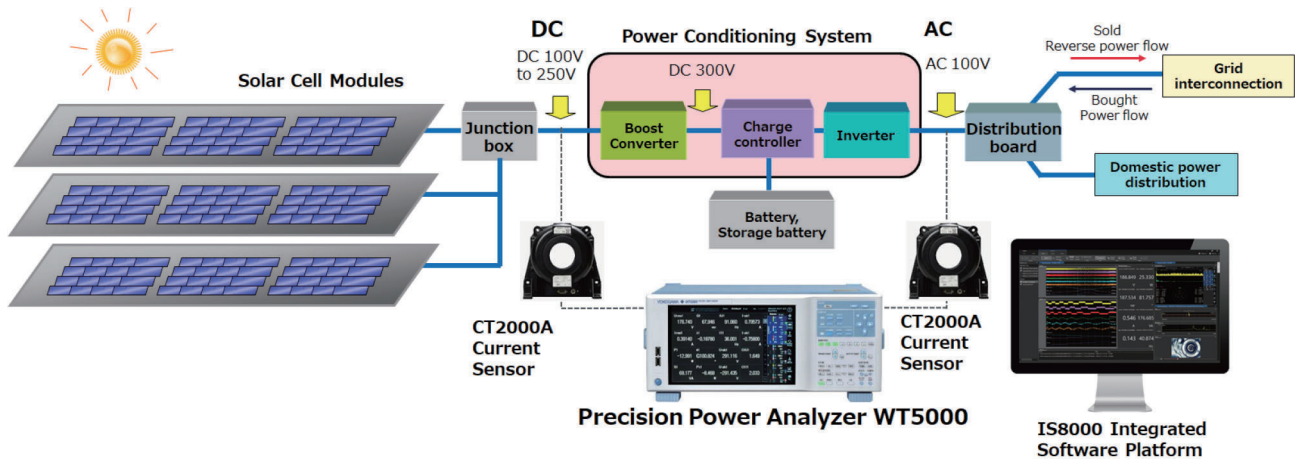


Support for Improving Power Conversion Efficiency and Power Quality in Solar Power Generation Systems, and Correlation Analysis of Data

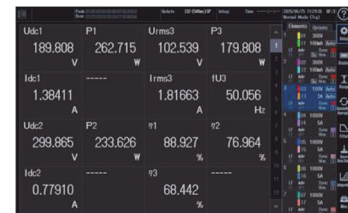
Features



- ◆ With up to seven inputs, a single unit of the WT5000 Precision Power Analyzer measures each component in a power conditioning system (PCS) including the converter, controller, and inverter.
- ◆ The power analyzer very precisely assesses the quality (output level, frequency and distortion) of the output power from a PCS to a power grid.
- ◆ The standard WT5000 can measure voltage up to 1500 Vdc and currents up to 30 A.
- ◆ Use of an optional external current sensor allows measurement of much higher currents up to 2000 A.
- ◆ The IS8000 software allows acquisition of numeric data synchronized with waveform data for correlation analysis.

Basic Concept or Summary

- ◆ **Support for improving power conversion efficiency and power quality of a PCS**
 With seven inputs, a single WT5000 Precision Power Analyzer can measure power converted by a PCS and its efficiency. By reducing the time required for development and evaluation, this provides increased efficiency. Many measured data can be directly viewed on the display. Fluctuations in power or efficiency can be displayed as numerical values or on a trend graph to allow users to understand the fluctuations intuitively even in the field.
- ◆ **Correlation analysis of numeric data and waveform data in evaluation of an entire solar power generation system**
 Use of the IS8000 integrated software (optional) enables not only recording and analysis of basic numeric data, such as the quantity of power generated and power conversion efficiency, but also synchronization of data from the WT5000 and waveform data from the DL950 waveform instrument. This allows for more detailed analysis of the system behavior under abnormal conditions by relating the waveform data to numeric data.



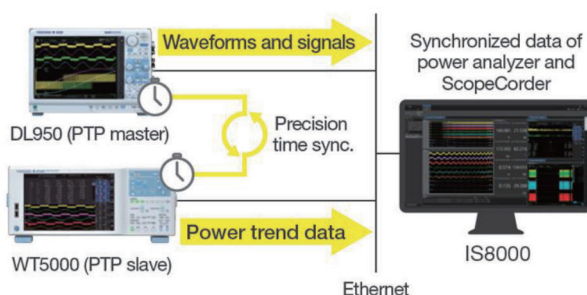
Example of WT5000 numeric data display



Example of WT5000 data trend display



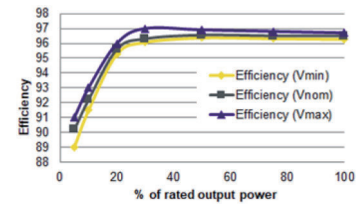
Example of IS8000 Integrated Software Platform display



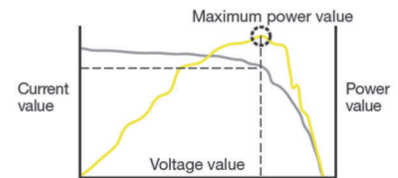
Example of waveform and numeric data synchronization

◆ **A single WT5000 can complete evaluation work that used to require multiple instruments**

As a promising means of achieving carbon neutrality, mega solar power generation systems are becoming more widespread. It is important to measure not only the maximum power conversion efficiency but also the efficiency closer to that in actual use conditions (e.g. euro efficiency, CEC efficiency), which is obtained by weighting according to a load factor the efficiencies measured at multiple points under light load to rated load. In the PCS, Maximum Power Point Tracking (MPPT) control maximizes the generated power. The WT5000 constantly measures the voltage peak value, current peak value, and maximum instantaneous power value (+ side, - side, respectively) along with voltage, current, and power. This information is not only utilized to evaluate a finished product but also contributes to improved development efficiency.



Example of CEC efficiency



Typical voltage, current, and power measurements in MPPT control

Image of MPPT control

◆ **Improving the efficiency in verification of an entire solar photovoltaic generation system**

The IS8000 integrated software allows detailed analysis of the correlation between numerical data related to power conversion efficiency and waveform data. Correlating the changes in numerical values with the changes in waveform data is useful for verification of an entire solar photovoltaic generation system and for identifying the causes of its problems.

Installation in Practice or Schedule

Domestic The WT5000 is the flagship model in the WT power analyzer series. Yokogawa Test & Measurement Corporation has introduced the series to the domestic photovoltaic generation market and has supplied models to manufacturers of electric vehicles, industrial equipment, and home appliances, as well as major manufacturers and suppliers of photovoltaic generation systems, mainly in PCS applications.

Overseas The WT5000 model, which has a large global market share, is made used in Europe, North America, and emerging countries including China as the testing device of choice for solar and wind power generation systems.

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