

Power Systems Division

Tetsuo Suzuki

This document summarizes the products that were developed by the Power Systems Division in 2013.

Developments consisted of the “SANUPS PMC-TD” power conditioner for photovoltaic power systems with lithium ion batteries,

the “SANUPS P83E” (100 kW) power conditioner for highly efficient photovoltaic power systems, the “SANUPS P61B” (1.5 kW and 5 kW), photovoltaic power system status monitoring service “SANUPS NET”, and photovoltaic power system

monitoring system “SANUPS PV Monitor E Model”.

The following information provides an overview and features for each product.

■ Development of the Power Conditioner for Photovoltaic Power Systems with Lithium Ion Batteries “PMC-TD”

We made an addition to our lineup with a lithium ion battery-equipped version of the “SANUPS PMC-TD” power conditioner for photovoltaic power systems, which also has a peak-cut function combining a photovoltaic panel and lead-acid battery.

This device consists of a 10 kW power conditioner unit and an I/O box, and it is a buildup system that can stack up to five 10 kW power conditioner units. The lineup includes models with system capacities ranging from 10 to 50 kW.

This product has 4 operation modes which can be switched between automatically. These operation modes are “grid-connected operation”, “peak-cut operation”, “isolated operation” and “charging operation”.

The lithium ion battery adopted this time has longer life and greater energy density than lead-acid batteries, allowing systems to be smaller, lighter and live longer.

Moreover, lithium ion batteries have long charging and discharging cycles, therefore are advantageous for use in applications where charging and discharging is repeated such as isolated operations, charging operations, and peak-cut operations. Lithium ion batteries have longer lives compared to lead-acid batteries.

Users are able to select the battery mostly suited to their application and it is anticipated that this model will be used in many markets as a power conditioner.



■ Development of the Power Conditioner for Photovoltaic Power System “SANUPS P83E”

In recent years, anticipation of renewable energy has risen as a way of achieving both the goals of economic growth and combating global warming. Among these, there are high expectations of photovoltaic power generation growing due to having a high volume available for potential use.

For such photovoltaic power systems, better conversion efficiency in power conditioners is being demanded in order to obtain even more power. Furthermore, photovoltaic modules have diversified, leading to an increasing demand for a wider DC input voltage range for power conditioners.

In order to meet such market demands, Sanyo Denki has developed the “SANUPS P83E”, a 100 kW power conditioner with high conversion efficiency which supports DC input

voltage over a wide range and has an isolated operation function.

The main circuit of this unit adopts a utility frequency link type main circuit which uses a utility insulation transformer. Conversion efficiency is the top class in the industry* at 95%. Moreover, in order to support the diversification of photovoltaic modules in recent years, the DC maximum input voltage was increased to 600 V.

As well as adding an isolated operation function and power factor change function, this product has been made highly-efficient, highly-functional and enabled various settings to be performed with ease through adoption of LCD in the operation section.

*As of March 2014. As a power conditioner of identical capacity for use in Japan Results from Sanyo Denki inspection.



■ Development of the Power Conditioner for Photovoltaic Power System “SANUPS P61B”

Amidst an increase in power generation equipment which utilizes renewable energy, expansion of the photovoltaic power system market is accelerating due to the feed-in tariff policy introduced in 2012. Recently there has been much attention on small-scale photovoltaic power systems which can effectively utilize limited space on the rooftops of cluster housing, retail stores, small offices and idle farming land.

The 1.5 kW / 5 kW “SANUPS P61B” power conditioner for photovoltaic power generation was developed for these applications.

This unit adopts a non-insulation method in the main circuit which does not use an insulation transformer, reducing heat loss through use of optimal parts and circuit design to

achieve 95% conversion efficiency, which is in the top class of the industry*.

Moreover, the 5 kW model has two MPPT circuits, so even if two strings of differing voltages were connected to the input circuit, it is possible to increase power generation efficiency by efficiently extracting the power energy of each string.

In addition to high efficiency, as a power conditioner for outdoor use, by using fully sealed (IP65) housing with excellent dustproof and waterproof properties, the main unit is protected from rain, dust, small insects and so on, therefore making it a highly-reliable product which can be used with even greater reassurance.

*As of March 2014. As a power conditioner of identical capacity for use in Japan. Results from Sanyo Denki inspection.



■ Development of the Photovoltaic Power System Status Monitoring Service “SANUPS NET”

The execution of the feed-in tariff policy for reusable energy has seen more power companies introduce photovoltaic power systems as power-selling business and are seeking the ability to monitor system operational status remotely as well as centralize data from multiple systems.

The photovoltaic power system status monitoring service “SANUPS NET” was developed to meet these demands.

By connecting Sanyo Denki’s power conditioner for photovoltaic power

generation and the “SANUPS PV Monitor” with RS-485 communication, information necessary for maintenance and monitoring of photovoltaic power systems is received and data collection is performed.

Moreover, by connecting to an Internet line with a router from the “SANUPS PV Monitor” it is possible to accumulate data on the “SANUPS NET” cloud server.

Customers are able to monitor the power generation and operational

status of photovoltaic power systems in remote areas by accessing cloud servers via the Internet.

Furthermore, we have developed a “mobile communication pack” for outdoor installation which includes a “SANUPS PV Monitor” and mobile router in a waterproof box in order to acquire data in places where it is difficult to install dedicated lines such as outdoor erection or rooftop lending.

■ Development of the Photovoltaic Power System Monitoring Unit “SANUPS PV Monitor E Model”

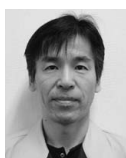
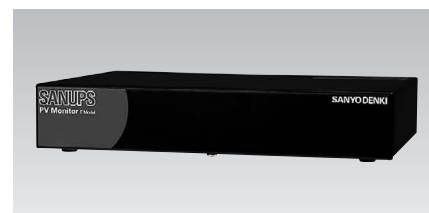
The “SANUPS PV Monitor” was developed in 2009 as a unit to monitor photovoltaic power systems in-plant LAN lines. Moreover, the abovementioned “SANUPS PV Monitor” was developed in 2013 with a “mobile communication pack” for outdoor installation mounted in a waterproof box for the “SANUPS NET” utilizing cloud services.

This time, the below performances and functions were strengthened more than the conventional model to make a product with even higher user-friendliness.

- The working temperature range has been expanded to be between

-25°C and +60°C, and specifications have been made the same as power conditioners for outdoor use.

- Due to requests from customers to have preservation of data for extended periods of time, we have made it possible to aggregate 25 months-worth of monthly reports in addition to the conventional daily report through strengthening of data collection and aggregation functions.
- Strengthened security and support of various code types.
- Strengthened email function and additional report email function.



Tetsuo Suzuki

Joined Sanyo Denki in 1984.

Power Systems Division, 2nd Design Dept.

Worked on the development and design of power supplies.