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Cover Product:

Power Supply Systems for a Distributed Power Supply

Manufactured from 1987 to 2000 (modified product continues to be sold)

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In the 1980s, information communication services were developing by leaps and bounds, with conventional services focused on analog telephones giving way to multimedia communications based around digital technologies. Around this time, Japanese telecommunications company NTT (Nippon Telegraph and Telephone Corporation) developed and began installing the D70 digital switch for both digital and analog subscriber lines. The method for supplying power to conventional communication equipment was the centralized supply method in which power equipment, which was installed in a central power room, supplied power to communication machinery rooms containing multiple pieces of communications equipment. However, due to developments in information communications services, this method could not adapt to fluctuations in demand from the power equipment and momentary failures in the power equipment could cause problems over a wide area, and thus this method was less than optimal.

As a result, reliable system design by scale, in which failures occur less easily as the scale of the communication equipment grows larger, was introduced. Power equipment is distributed among each communication equipment, and the corresponding power equipment created a distributed power supply system that adjusts to the installed capacity. In the distributed power supply system, power equipment is installed in the communication machinery rooms, so small and light-weight models are required due to floor load restrictions. In addition, there are more pieces of equipment, so there was demand for lighter maintenance work and the ability to easily increase capacity to meet the communications equipment.

In order to meet these customer trends, Sanyo Denki worked on developing power equipment for communications, including AC power supplies (UPS), DC power supplies (CONV), exchange signal power supplies (RG) and information transmission equipment (RE). All could be mounted in a standard cabinet known as the INS cabinet with light weight and identical dimensions. Starting in early 1986, a model was developed over the course of a year and released to market, meeting customers' demanded delivery.

The UPS uses an add-on capacity system that can combine up to five 1 kVA unit inverters for a maximum output capacity of 5 kVA, and it switches to commercial bypass without momentary power breaks during unit failure or overload capacity. The inverter is small and light weight due to high frequency switching technology with a conversion frequency of 25 kHz, it uses controls from a microprocessor, and realizes high density mounting. The initial capacity in the scale of the communication equipment was 2 to 5 kVA, and it could adjust to meet demand as an add-on capacity system with expansions. At the same time, there were two major issues with bringing this product to market. The add-on capacity system combined units from different production lots, and in order to maintain load balancing, it realizes stable characteristics of unit load within the permitted value. Furthermore, in communication equipment, AC is rectified, so the height of the UPS output voltage waveform is lowered from the harmonic current. As a result, measures must be taken to prevent mistaken detection of an outage on the load side, but Sanyo Denki stayed on the forefront of the industry by providing an economical solution.

The CONV is a unit that sends rated voltage DC power from input power DC -48 V to DC +50 V, and it operates in large-capacity parallel redundant operations that can install multiple output 2 A or 10A units. It realizes small size and light weight with frequency switching technology from conversion frequency 50 kHz.

The RG takes input power supply DC -48 V and generates 16 Hz ringing signal, 400 Hz tone, 400 Hz busy signal, and 400/16 Hz ringing tone for telephones and similar devices. It supplies the necessary grounding intermittent signal for controlling, billing, monitoring, and warning of failure for the switch. Along with use of the microprocessor to design a smaller size, two units operate in current and preliminary operation method.

The RE takes measurement, status, failure, and diagnosis information from each piece of power equipment in the distributed power supply system and sends the information to a centralized monitoring center, enabling remote monitoring. Remote tests and controls can also be performed on each piece of power equipment from the center, which realizes a reduction in maintenance work.

In this way, the communications power equipment in a distributed power supply system was realized through a combination of the broad collection of technology from Sanyo Denki and new technology developments. During the original manufacturing period (1987 to 2000), approximately 5000 racks and nearly 35,000 units of each major type were produced for a total sales of 15 billion yen, and thus it greatly contributed to the Power Systems Division. Furthermore, development and delivery of a product that met customer demands resulted in high marks from customers as well as an expanded market share. While Sanyo Denki had long questioned how to raise its position, this product suddenly increased its standing in the market.

This equipment was introduced as an expansion of the D70 digital switch, but the switch was not actively revised for a long time afterwards. Therefore, in order to maintain power equipment and with longstanding maintenance service, it has become a long-lasting product necessary for simplified power equipment even to this day.

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1970 Joined Sanyo Denki. 2nd Design Department at Ueda Works.
1986-1987 Assistant Manager of the 3rd Device Division, 2nd Design Department, and the 2nd Production Department.
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