

Power Systems Technology Required for Overseas Products: "Safety and Functions Required for Overseas UPS's"

Chiaki Seki

1. Introduction

In recent years, as company operations have become more globalized and more segmented both at home and abroad, maintaining the stability of computer-centered network systems has become extremely important. For this reason, uninterruptible power supplies (UPS) must have performance equal to that of continuous inverter power supply systems, as well as high exchange efficiency. This need is witnessed in many different fields: office automation equipment, communications equipment, manufacturing equipment and so on.

This report will outline the common technologies that must be examined for Power Systems Division export products, and will present an overview of the functions of the "SANUPS E11A", one product in the "SANUPS E" series being developed for overseas markets.

2. Export product needs

Currently, the Japanese manufacturing industry faces tough competition from overseas products. Without absolute technical superiority, it will be difficult to choose the proper system by which products can be manufactured in Japan and exported to other countries. If the products offer similar performance, Japan cannot hope to win out in the market over overseas products that focus on cost-competitiveness.

In addition to dramatic cost reductions in products for export, we must make up for the cost differential with overseas products through product development that provides functions, performance and reliability that meet the needs of local consumers.

3. Current state of Power Systems Division export products

At present, Sanyo Denki's Power Systems Division does not market many products in overseas countries. To make Sanyo Denki products more competitive in overseas markets, we must do the following.

3.1 Active use of overseas parts

Firstly, in order to reduce the cost of products, we are actively using Chinese parts in order to reduce material costs, as well as reducing manufacturing costs through production at overseas factories. In the current environment, with its emphasis on cost, even if some risk is involved, we must actively use Chinese parts while avoiding the risks as much as possible. It is no exaggeration to say that without this step we cannot hope to remain cost-competitive. Nevertheless, appropriate effort and labor will be needed to successfully incorporate Chinese parts, and part selection techniques must be improved further in the future. At the Power Systems Division, Chinese parts are used primarily in relays, breakers, switches and other circuit breaker and wiring connectors, transformers, standard miniature resistors and condensers and so on. The general principles for the selection of these parts are as follows:

- (1) The part itself must be approved under multiple overseas standards
- (2) The manufacturing plant must have ISO, etc. certification
- (3) The results of use by major manufacturers must be investigated
- (4) The part must be disassembled and inspected
- (5) Reliable delivery drawings must have been completed

In order to employ third party check mechanisms, the relays, standard parts and the like that are selected must be

certified parts approved under multiple overseas safety standards. As parts manufacturers must regularly undergo safety standards review, this can be expected to maintain the quality of parts to some degree. The Division also tours local manufacturers to check directly for problems with manufacturing lines and quality control procedures.

In addition, when consigning manufacture using Sanyo Denki specifications, it is important to have the manufacturer submit delivery drawings that are on par with production drawings. In the case of a transformer, for example, to the greatest extent possible the sizes are entered and detailed requirements are imposed for the material, number of windings, thickness etc. for the insulation tape and margin tape inserted between coils. In the case of a Japanese manufacturer, in most cases no problems will result even if the company is not required to submit such detailed specifications, but they are needed for overseas manufacturers.

Moreover, when using overseas parts it is always necessary to disassemble and evaluate samples.

3.2 Certification under safety standards

Unlike the products of Sanyo Denki's other divisions, safety standard certification of the products of the Power Systems Division cannot be done by certifying these products as "parts;" it must be done by applying for certification of the products as "equipment or devices" and ensuring conformance with the standard. Product safety for these products assumes use by an end user (someone with no specialist electrical knowledge) and commensurate consideration must be given to ensuring safety. This is by no means an easy hurdle to overcome.

Nevertheless, in overseas markets, unlike in Japan, certification under safety standards is the basis for equipment selection. Accordingly, consideration must be given to the safety standards in the country in which the product will be marketed.

Export products must have the technologies needed for conformance with overseas safety standards. For this reason, finding ways to reduce the cost increases that result from measures to obtain certification under these standards is an important issue.

Moreover, certification under safety standards is not compatible from one country to the next, so an investigation must be made to determine what standards and restrictions exist in each country in which the product will be marketed.

Table 1 Unit types and standards

Type	UL standard	CE marking EU standard (international standard)	Compatibility between standards
UPS	UL1778	EN62040 (IEC62040) or EN55011 (EN55022)	×
Information processing equipment	UL60950	EN60950 (IEC60950)	○

Table 2 Requirements for safety standards

UL standard requirements	CE marking requirements
Safety (safety / electric shock)	Low-voltage instruction (safety / electric shock) / Electromagnetic waves (EMC)

Note: In the case of the United States, some EMC standards are prescribed by FCC standards.

For example, when certifying a UPS under the UL standard and acquiring a CE marking, the requirements under the standard are slightly different for the United States and Europe. Table 1 shows the standards that apply to UPS and other information industry equipment. Table 2 shows the requirements of safety standards that must be met by export products.

As Table 1 and Table 2 show, in the case of a UPS, currently the safety standards in the United States and Europe are not fully compatible with one another. In addition, as Table 2 shows, the UL standard does not mention electromagnetic compatibility (EMC), but compliance with the EMC standard is needed when declaring a CE marking.

For this reason, when declaring both UL certification and a CE marking for a UPS, the unit must meet both safety requirements. In other words, if the product will not be sold in the European market, obtaining certification under only the UL standard would be advantageous in terms of both expense and maintenance.

At present, the Power Systems Division has obtained or is in the process of obtaining certification for the following export products under the standards indicated.

- Products already certified
 - "SANUPS ASD" (UL 1778)
 - "SANUPS ASE" (UL 1778)
 - "SANUPS DA" (UL 60950 - CE <IEC 60950>)
- Products planned for certification
 - "SANUPS E11A" (UL 1778 - CE)



Fig. 1 "SANUPS E11A"



Fig. 4 Mounted on 19-inch rack

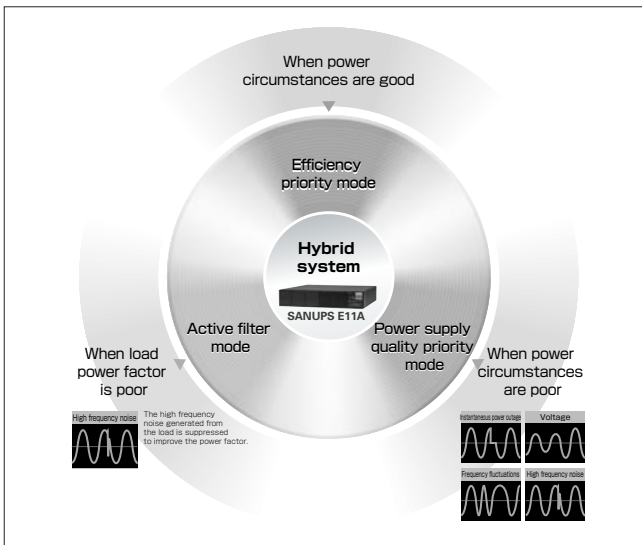


Fig. 2 "SANUPS E11A" operating mode 1



Fig. 5 Placed vertically on floor

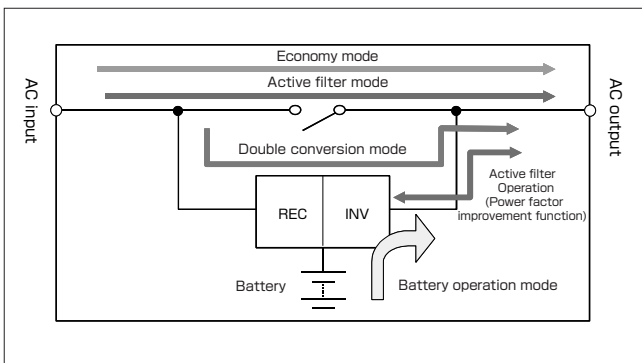


Fig. 3 "SANUPS E11A" operating mode 2

Note: Stabilizer to prevent toppling included.

3.3 Superior functions of "SANUPS E11A" as compared to competing products

The basic functions needed by UPS are to consume as little unnecessary power as possible at normal times when the commercial power supply is stable, and to provide reliable

backup operation in the event of a power outage or instantaneous interruption. Nevertheless, the quality, installation environment and method of operation of commercial power supplies are different for users in different countries. As a result, it should be possible to achieve

superiority over other competing companies by developing an inexpensive, energy-conserving, highly reliable UPS as an export model.

One of the superior functions of the "SANUPS E" series currently being developed by Sanyo Denki is the use of a hybrid system. With a hybrid system, no matter what the user's power supply situation is, the UPS automatically selects the power supply mode that matches that situation.

Fig. 1, Fig. 2 and Fig. 3 show an external view and the operating modes of the "SANUPS E11A" in the "SANUPS E" series.

When the power supply conditions are good, the UPS operates in economy mode with 95% power efficiency. When the power factor on the load side is poor, the unit switches to active filter mode to improve the power factor. When the power supply conditions are poor, the unit switches to double conversion mode to enable supply of high quality, stable inverter output to the load equipment. It is also possible to manually set the unit to remain in a specific operating mode in order to have energy-conserving operation take priority.

The "SANUPS E11A" can either be installed in a 19-inch rack or placed on the floor.

As this unit has a variety of settings to match the user's power supply conditions and method of installation and operation, it can be used worldwide. This is a function worthy of special mention, as it is not possessed by any competing product.

4. Conclusion

Development of the "SANUPS E" series is continuing, and the 1 kVA "SANUPS E11A" is already being exported to the United States. The "SANUPS E" series has been developed with maximum consideration for various overseas power circumstances and usability. Sanyo Denki is confident that SANUP E series products will be seen in overseas markets as attractive UPS products that offer high reliability and high efficiency at a low cost.

* UL: Underwriters Laboratories Inc.



Chiaki Seki

Joined Sanyo Denki in 1987

Power Systems Division, 2nd Design Dept.

Worked on power unit and power management system development and design