

Expansion of Mini-UPS Series and Networked Operation Support

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1. Introduction

In today's fast-paced information society, communication devices such as computers are required to be highly reliable, and accordingly, a stable power supply is an absolutely essential prerequisite. The use of an uninterruptible power supply (UPS) to protect critical devices from disturbances such as power failures, surges and noise, is already common knowledge among users. In addition to computer applications, UPSs have recently also been used in other various applications, and there is a growing diversity of specification requirements. Demands are emerging from new markets that had not existed before, including for example, demand for a capacitor-type UPS that does not require battery replacement and demand for a low-profile UPS that can be used with machine-room-less elevators. As for the management (chiefly, computer power management) of load devices that are backed-up by the UPS and the management of the UPS itself, UPS manufacturers are being requested to provide power management solutions suitable for different user environments.

In response to these demands from a diversifying market, Fuji Electric has developed the DipHunter, a maintenance-free instantaneous voltage drop protection device, a P-series UPS for use with elevators, a J-series UPS that supports foreign voltages, and the NetpowerProtect 200 V, 3,000 VA rack-type off-line UPS. To support networking, Fuji Electric has also developed the multi-server shutdown box and Web/SNMP (simple network management protocol) card UPS peripheral devices, and NetpowerView-F UPS management software. These products are introduced below.

2. Expanded Series with More Varieties of Models

2.1 DipHunter instantaneous voltage drop protection device

Nearly all power failures in Japan in recent years have been instantaneous voltage drop, with the majority lasting for no more than 200 ms and incurring a

Fig.1 External view of DipHunter instantaneous voltage drop protection device



voltage dip of no more than 50 %.

Aiming to protect load devices from the instantaneous voltage dips that comprise nearly all power failures, the DipHunter (Fig. 1) is a power supply device designed to have the features of compact size, light weight and maintenance-free operation. The principle features of the DipHunter are described below:

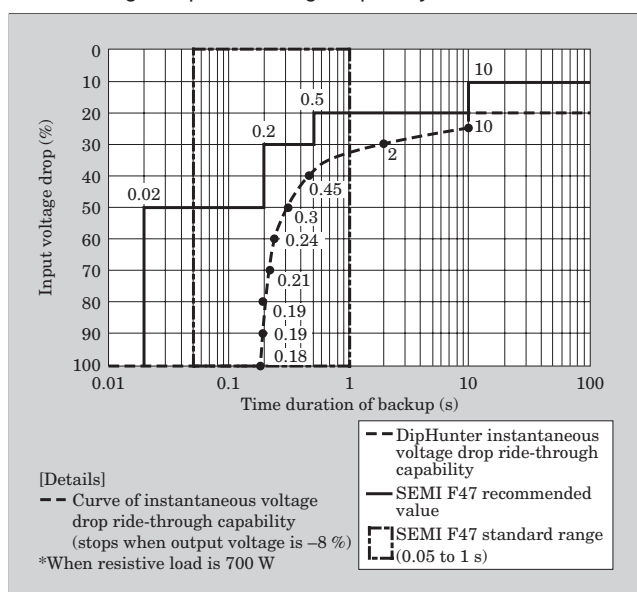
- (1) SEMI (semiconductor equipment and materials international) F47 standard compliant

The SEMI F47 standard (Fig. 2) defines the instantaneous voltage drop ride-through capability required for semiconductor manufacturing equipment. The DipHunter not only complies with the standards for the prescribed region, but additionally provides a wider area of support up to recommended values.

- (2) Maintenance-free operation

The DipHunter is limited to protecting against instantaneous drop and utilizes a backup method based on stored capacitive energy. Consequently, use of the DipHunter will eliminate the troublesome and regular replacement of batteries, and enable operation to continue maintenance-free for 8 years (at an ambi-

Fig.2 SEMI F47 standard and DipHunter instantaneous voltage drop ride-through capability



ent temperature of 25°C) until reaching the end of the useful life of the product.

(3) Compliant with overseas standards

To simplify the processing of devices for export overseas, the DipHunter has acquired UL1778 certification, an overseas safety standard, and also conforms to CE marking standards.

2.2 P-series UPS for use with elevators

This space-saving low-profile UPS can be installed in locations where the installation space is limited. Especially in building and train station elevators, where there has been a trend in recent years toward machine-room-less designs due to space constraints, there is growing demand for low-profile wall-mount type UPS devices capable of powering an elevator to the nearest floor during a power failure.

In response to these market demands, the low-profile P-series UPS (Fig. 3) has been developed and commercialized. Its main specifications are described below:

- (1) Low-profile, wall-mount model having a thickness of 90 mm
- (2) Two types of rated output capacities, 2 kVA and 3 kVA
- (3) I/O is single-phase 200 V, with no step-up/step-down transformer
- (4) The main body and battery unit are constructed separately, enabling installation and battery replacement to be performed simply

2.3 J-series UPS that supports foreign voltages

Demand for mini-UPSs has been growing in recent years, not only for use with server devices, but also for other applications. In particular, there is increasing demand for UPSs to be built-into electronic equipment,

Fig.3 External view of P-series low-profile UPS



most notably semiconductor manufacturing equipment, as backup power supplies for the devices installed in that equipment. Since the equipment is intended for both domestic use in Japan and for overseas export, it is strongly required that the equipment be compatible with foreign voltages and foreign standards.

In response to these market demands, Fuji Electric has developed and commercialized a foreign-voltage-compatible UPS that is based on its J-series UPS. Main features are listed below:

- (1) I/O voltage
 - (a) 700 VA model
Three types: 110 V, 115 V, 120 V AC
 - (b) 5, 7.5, 10 kVA model
208 V AC
- (2) Support of foreign standards
Acquired UL1778 certification, conforms to CE marking standards
- (3) External dimensions and weight are the same as the standard J-series

2.4 NetpowerProtect 200 V, 3,000 VA (rack type) off-line UPS

Influenced by the recent trends toward smaller size and lower cost servers, backup power supplies for servers have accelerated the transition from use of on-line UPSs (UPS) to use of small, low-cost off-line UPSs (SPS).

Moreover, the power supplies for upper level systems are often 200 V, and to expand the application range so as to include those power supplies, a 200 V, 3,000 VA rack-mount type SPS has been developed and commercialized. Figure 4 shows an external view of the device, and its main features are listed below:

- (1) High frequency conversion technology realizes compact size and light weight without use of

Fig.4 External view of NetpowerProtect 200 V, 3,000 VA rack-type UPS



commercial transformers

- (2) Succeeds the high reliability and high quality of the NetpowerProtect series
- (3) Can use the wide array of options (such as peripheral devices and UPS management software, to be described later) of the NetpowerProtect series

3. Expanded Line of Peripheral Devices, Support of Networked Operation

3.1 Multi-server shutdown box

The multi-server shutdown box (MSD box) uses standard UPS management functions of the OS and is an optional product for use with mini-UPSs having a function for safely shutting down servers by means of a contact signal. The contact signal (input power abnormality signal and battery voltage dip signal) from the mini-UPS branches to a maximum of 8 servers, and this signal can safely shutdown each server when a power supply abnormality occurs. Figure 5 shows the configuration of the connections.

The product (see Fig. 6) consists of an interface card installed in the mini-UPS, an expansion box (19-inch 1 U pitch rack-mount type). See Fig. 7) that branches the signals, and connection cables that link the interface card with the expansion box. Additionally, a small-footprint desktop-type expansion box is also available. (Up to 4 servers can be connected to each unit. A maximum of 2 units enables connection of up to 8 servers. See Fig. 8.)

3.2 Web/SNMP card

Figure 9 shows the external view of the Web/SNMP card. The Web/SNMP card fits into the UPS's card slot and is a device that performs management and information transmission and reception functions for the UPS via a network, without relying on the server's OS. Functions of the Web/SNMP card are described below.

3.2.1 Web functions

A UPS equipped with a Web/SNMP card can be

Fig.5 Schematic diagram of connections for 19-inch rack-type multi-server shutdown box

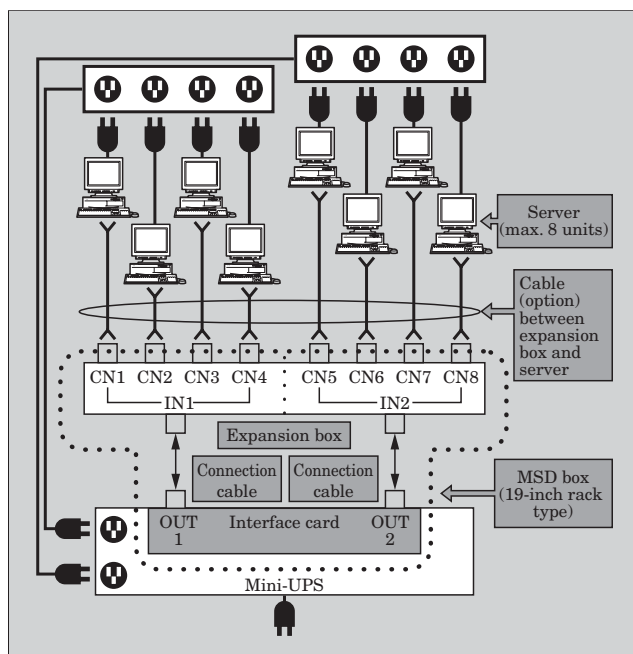


Fig.6 Component parts of multi-server shutdown box

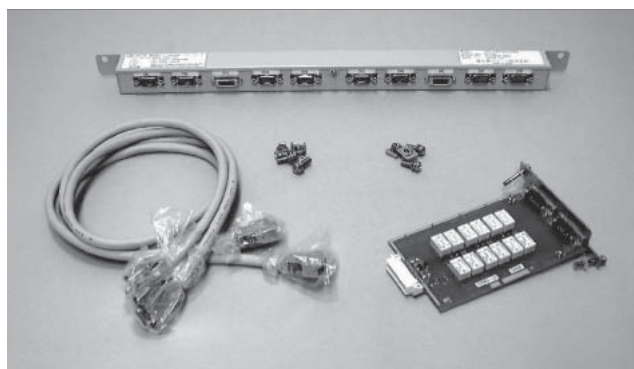
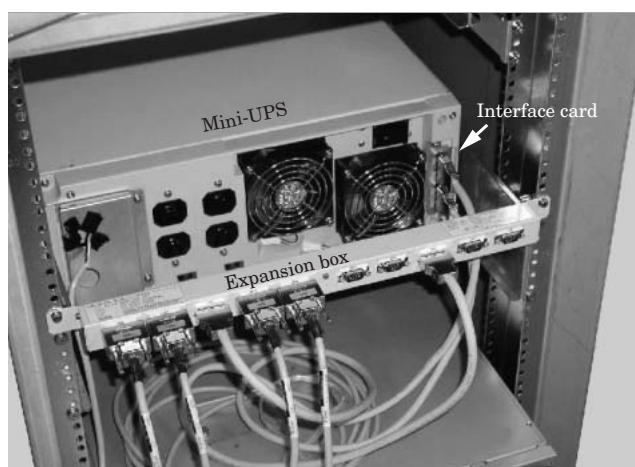


Fig.7 External view of installation of 19-inch rack-type multi-server shutdown box



remotely managed from a client (WWW client), in which general-purpose browser software is installed,

The following types of web screens are available. From the client, it is possible to monitor the status, retrieve information, and implement settings for e-mail transmission and scheduling of the UPS.

The UPS output stop and start time settings are entered from the schedule setting screen (Fig. 10) and can be specified as daily or weekly settings or set to occur on a specific date.

3.2.2 SNMP-based UPS management

The Web/SNMP card is provided with a SNMP agent function. Therefore, if a UPS equipped with a SNMP card is added to a PC network system in which SNMP management software is installed, UPS management can be performed without requiring any changes.

When a power failure or other event occurs, the

SNMP manager (PC in which SNMP management software is installed) at the specified IP address can be notified of the occurrence of the abnormal event by using a SNMP trap.

3.2.3 Multi-server shutdown function

Multi-server shutdown is a function that shuts down a multiple number of servers residing on the same network (TCP/IP). Figure 11 shows an example configuration of a multi-server shutdown system that transmits remote console commands (RCCMD) from a Web/SNMP card equipped in a UPS.

When a power failure occurs, the Web/SNMP card transmits a shutdown command via a network (TCP/IP) to a multiple number of servers in which RCCMD software module has been installed.

In response to this shutdown command, each server that is powered by the UPS terminates its programs, enabling the OS to be shutdown safely.

Fig.10 Example UPS schedule setting screen of Web/SNMP card

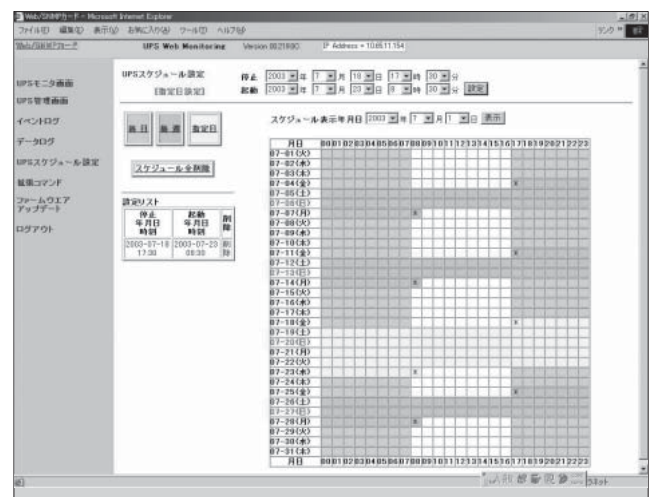


Fig.11 Example Web/SNMP card system configuration

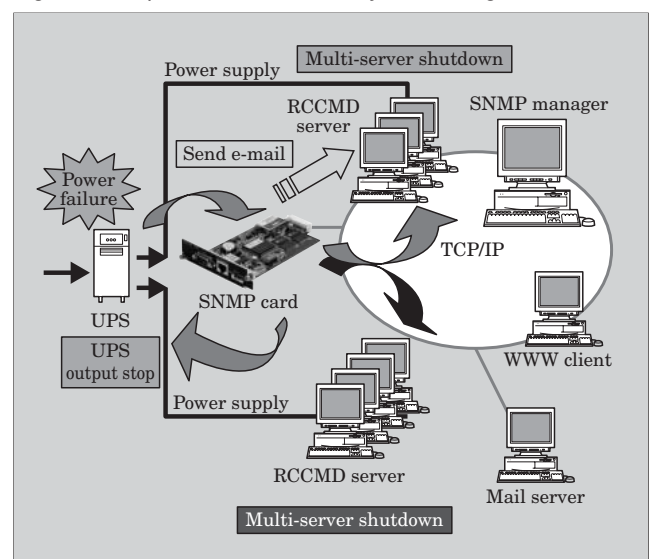
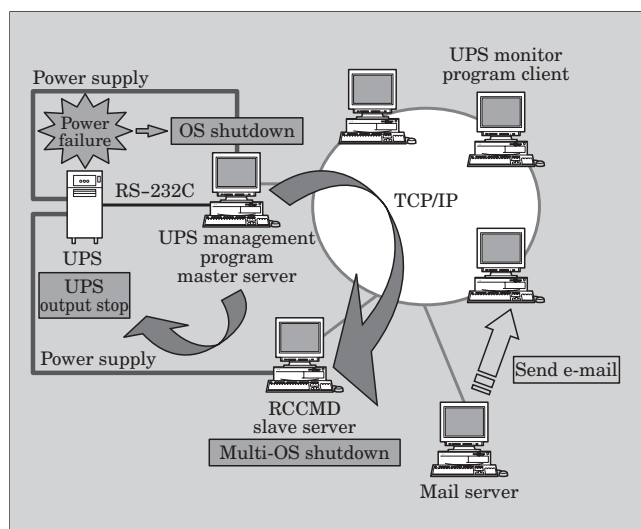


Fig.12 Example NetpowerView F system configuration



3.3 NetpowerView F UPS management software

NetpowerView F is installed in the master server and is a program for UPS management via serial communication (RS-232C), which corresponds to NetpowerProtect series.

Figure 12 shows an example configuration of a system using NetpowerView F.

Recently, many servers are being configured with Linux*¹ as the OS, and new distributions are being developed one after another. Accordingly, NetpowerView F, which is installed on a server machine to monitor and control a UPS, will phase in new distributions to support the operating environments of:

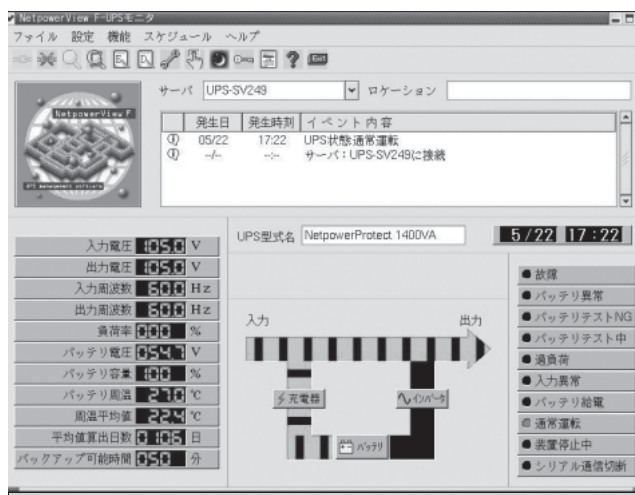
- Windows XP/Server 2003
- Red Hat Linux 7.3/8.0
- Red Hat Enterprise Linux AS/ES
- Turbolinux 8

in addition to the operating environments of Windows*²

*1: Linux is a registered trademark of Linus Torvalds in the US and other countries.

*2: Windows is a registered trademark of Microsoft Corp. of the US.

Fig.13 Example UPS monitor screen (X-window version)



95/98/NT4.0/2000 and Linux (Red Hat, Turbo, Open) which it already supports.

Moreover, the UPS monitor screens of the Linux version running in an X-window environment feature improved GUI (graphical user interface) display functions and have been designed to be easier to view and easier to navigate.

Figure 13 shows an example UPS monitor screen of the X-window version.

4. Conclusion

The products introduced above are all highly refined products that have incorporated user requests for UPSs and been subject to repeated improvements, or are newly commercialized versions of prior products that have been customized to support the usage environments and required specifications of niche applications. It is the duty of the manufacturer to provide easy-to-use products to its customers, and Fuji Electric will continue its efforts to develop even better products for the future.

Reference

- (1) SEMI STANDARD. SEMI F47-0200, 2000.



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