# Development of the "LAN Interface Card with Environmental Monitoring"

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## 1. Introduction

In recent years, interest in global environmental protection has grown, and with the requests for energy conservation after the Tohoku Earthquake, various industries have begun emphasizing energy conservation.

Even in server rooms using uninterruptible power supplies (hereafter referred to as UPS), in order to achieve efficient cooling controls for server racks and server rooms, there is demand to collect environmental information, such as temperature and humidity, and perform analysis to visualize data.

Previously, specialized devices needed to be purchased in order to collect environmental information, creating issues with cost and installation space.

To solve this problem, we developed a function to monitor environmental information that works within our LAN interface card, a product used within our UPS. We developed the "LAN interface card with environmental monitoring", which has added functions for obtaining measurements, such as internal temperature and humidity, and visualizing the collected measurements, and the "temperature sensor/humidity sensor" (hereafter referred to as "sensor"). The conventional model "LAN interface card" was introduced in Technical Report No. 34.

This document introduces an overview of the LAN interface card with environmental monitoring and the sensor.

## 2. Product Overview

Fig. 1 shows the appearance of the LAN interface card with environmental monitoring while Fig. 2 shows the sensor.

The LAN interface card with environmental monitoring has the expansion board to communicate with the sensors. The shape and dimensions are the same as the standard type. In addition to the conventional functions, such as automatic shutdown and startup of computers, scheduled operations, and remote monitoring of the UPS, by installing the new model to a UPS, ambient temperature and humidity can be monitored.

The temperature sensor and humidity sensor have the same shape and dimensions, and are only differentiated by a different internal sensor IC. Customers can choose from two sensor installation methods depending on the installation environment: the magnet method, which enables easy installation to metal surfaces such as the side metal plates or braces on a rack, and the fixed method using screws.

Fig. 3 shows the connections for the new model. The LAN interface card with environmental monitoring is mounted on a UPS. The sensors are connected using commercial LAN cables, and with daisy chain connections, the temperature or humidity of up to 16 locations can be measured.


Fig. 1: Appearance of the LAN interface card with environmental monitoring

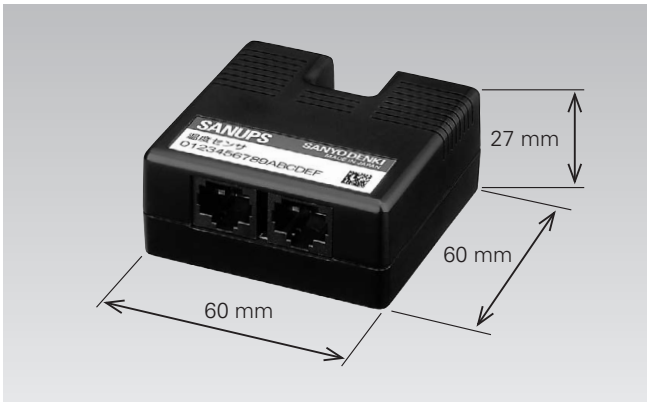



Fig. 2: Appearance of the sensor

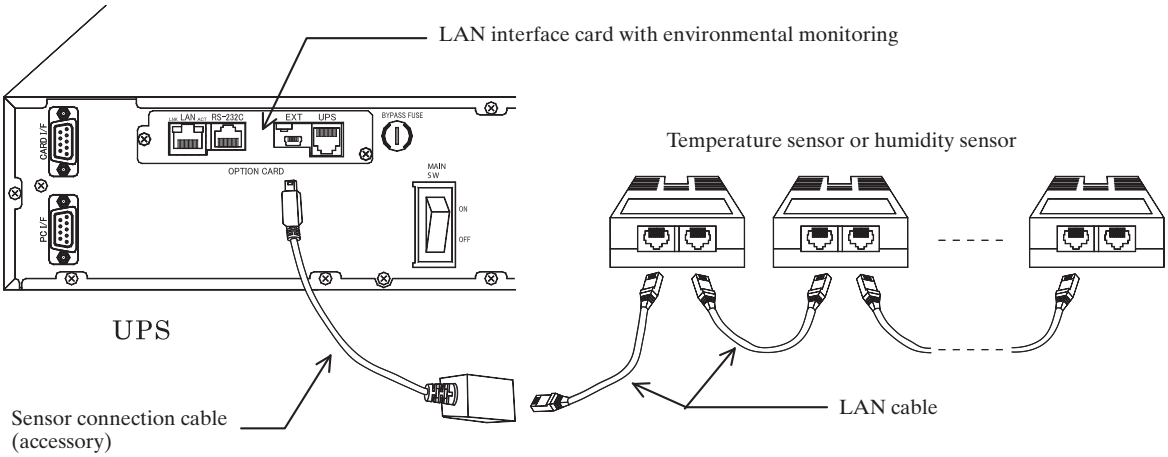



Fig. 3: Example of connections

## 3. Features

### 3.1 Environmental measurements

(1) A total of up to 16 temperature sensors and humidity sensors can be connected.

(2) The LAN cable connecting to the sensor can be extended up to 100 m, and enables the LAN interface card to measure the environment in places such as the server rack and server room.

### 3.2 Monitoring and management

(1) The statistical information for the measured temperature and humidity levels can be observed on a graph for daily, monthly, and yearly reports.
Fig.4 shows an example of the display showing the statistical graph of ambient temperature.

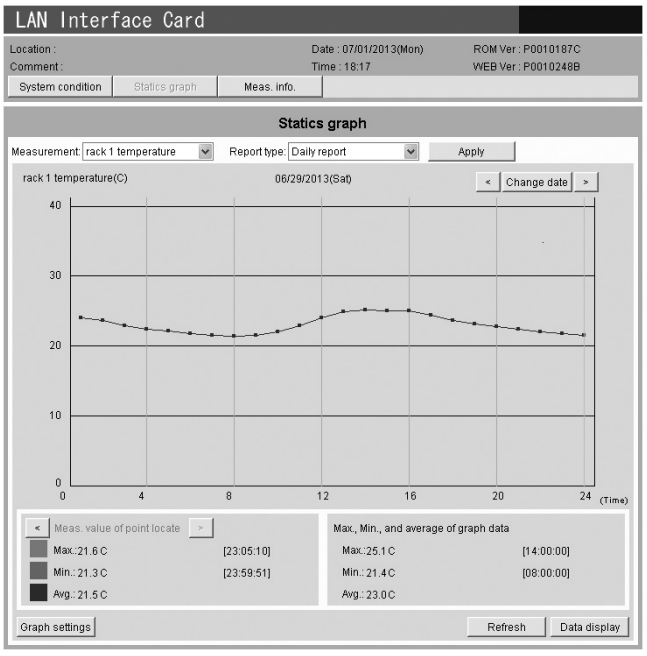



Fig.4: Example of statistical graph of ambient temperature

(2) The measured information can be saved as data, making management simple.
The data retention periods are as follows:
Total hourly data: Current month + past 3 months
Total daily data: Current year + past 2 years
Total monthly data: Current year + past 10 years

(3) In addition to the UPS load factor, ambient temperature, and input voltage, by setting the external temperature and humidity thresholds, deviations from the measurement threshold can be monitored.

(4) When there is abnormal measurement, the server or computer can be shut down.

### 3.3 Simple installation

(1) There is no need to buy a special device for measuring temperature and humidity, so costs and installation space can be reduced.

(2) The sensors can be installed easily just through connections using commercial LAN cables.

(3) Sensors can be added without stopping the system.

## 4. Benefits for Customers

Fig. 5 shows an example of a system configuration using the new model.

Visualizing and dispersing the power and temperature in data centers or server rooms is the foundation of energy-saving measures. Previously, expensive environment monitoring devices or similar equipment would need to be purchased and operated separately.

The new model adds environment monitoring functions to a conventional LAN interface card, which enables a low-cost method of visualizing power and temperature, making it a highly cost-effective product that reduces TCO*1.

*1 Total Cost of Ownership. The total cost for installation, maintenance, and management of systems.

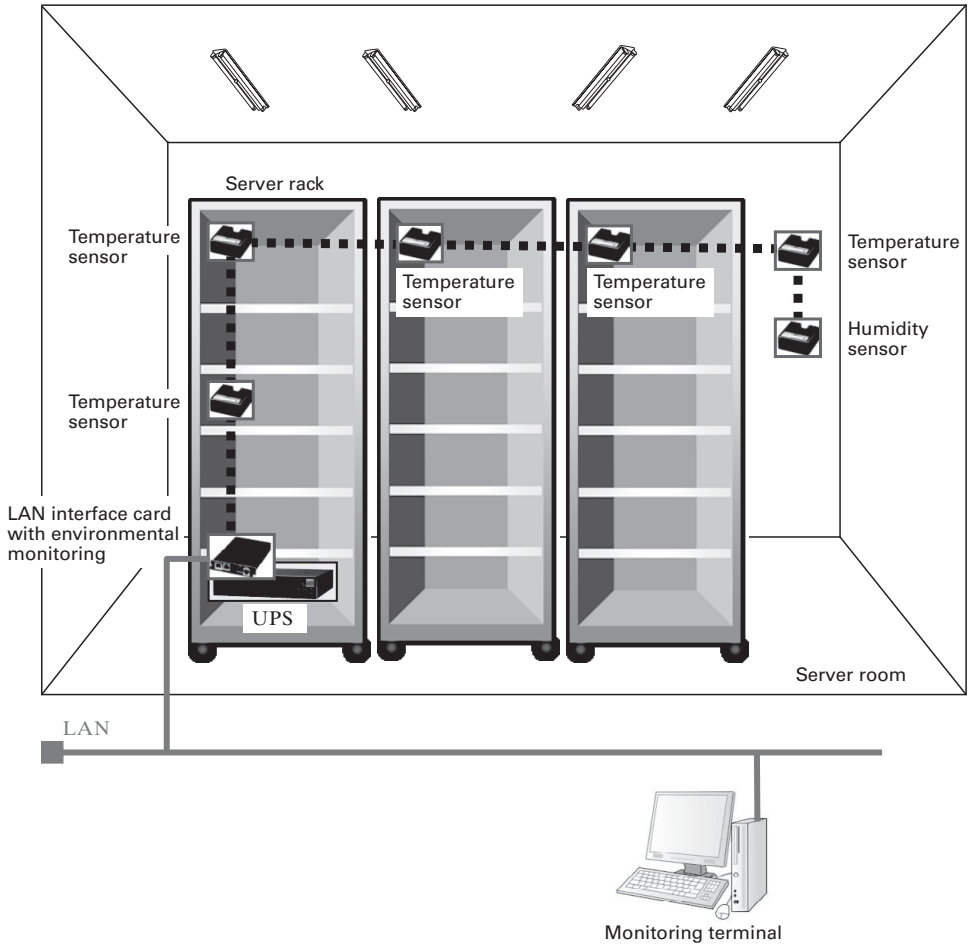



Fig. 5: Example of system structure

## 5. Specifications

Table 1 shows the specifications for the LAN interface card with environmental monitoring, while table 2 shows the specifications for the sensor.

Table 1: Specifications of the LAN interface card with environmental monitoring

| Item | Specifications |
|---|---|
| **Model number** | PRLANIF005 ／ PRLANIF006 |
| **Dimensions (W x D x H)** | 105×125×23.5 mm |
| **Mass** | 160 g |
| **Operating environment** | -25 to +60˚C |
| **Power consumption** | 3.5 W or less (LAN interface card + 16 sensors) |
| **Functions** | • Automatic computer shutdown (supports multiple platforms)<br>• Redundant power computer shutdown<br>• Automatic computer startup after recovering power<br>• Scheduled operation<br>• UPS status display (supports Web browsers, SSH, or Telnet)<br>• SNMP agent (RFC1628, JEMA-MIB, or the private Sanyo Denki MIB)<br>• E-mail sending and receiving<br>• Supports NTP (Network Time Protocol)<br>• Download or upload settings<br>• Test function (script execution, E-mail sending, SNMP trap sending, shutdown)<br>• Event notification to the syslog server<br>• Temperature or humidity measurements (up to 16 points)<br>• Measurement deviation monitoring function (UPS internal information, external temperature/humidity)<br>• Statistical graph display function (UPS internal information, external temperature/humidity) |

Table 2: Specification of the sensor

| Item | Temperature sensor | Humidity sensor |
|---|---|---|
| **Model number** | PRLANSN001 | PRLANSN002 |
| **Dimensions (W x D x H)** | 60×60×27 mm | |
| **Mass** | 50 g | |
| **Operating environment** | Temperature: -25˚C to +80˚C<br>Humidity: 0 to 90% RH (no condensation) | Temperature: -25˚C to +80˚C<br>Humidity: 0 to 95% RH (no condensation) |
| **Measurement range** | -25˚ C to +80˚ C | 5% to 95% RH (no condensation) |
| **Accuracy** | ±1.0˚C (-10˚C to 80˚C)<br>±2.0˚C (less than -10˚C) | Accuracy after 5 years: ±8% RH<br>Accuracy after 10 years: ±10% RH |
| **Max. cable length** | 100 m total extension | |
| **Max. connections** | 16 | |
| **Compatible cables** | LAN cable CAT5 or higher, straight (8 core) | |

## 6. Conclusion

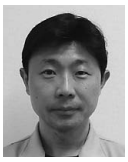
This document introduced an overview of the LAN interface card with environmental monitoring and the sensor.

With the development of the new model, we have enriched the options for the LAN interface card and we can offer a product that supports new demands for environmental monitoring.

We will continue to develop products that support market demands, and by enriching the LAN interface cards, we will contribute to making SANUPS even more attractive products.

Documentation

Yutaka Katoh and Others: Development of the "LAN Interface Card" SANYO DENKI Technical Report, No. 34, Nov. 2012



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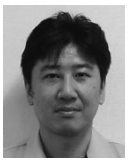

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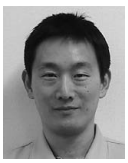

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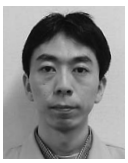

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