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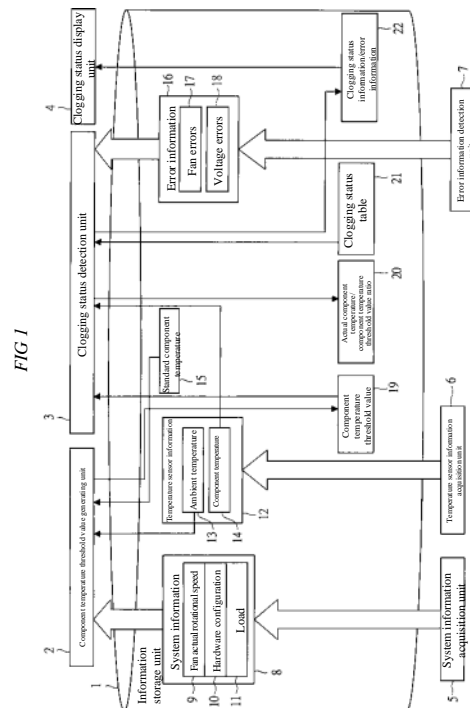
(54) [Title of the invention] Dust filter clogging status detection method and dust filter clogging status detection device

(57) [Abstract]

[Problem] To provide a dust filter clogging status detection device capable of more accurately detecting dust filter clogging status using system load/configuration information.

[Solution] A dust filter clogging status detection device comprising a component temperature threshold value generating unit 2 which, on the basis of standard component temperature 15 information for multiple components making up an information processing device, system information 8 for the information processing device, and information indicating the internal status of the information processing device, generates component temperature threshold values 19 for the multiple components making up the information processing device; and a clogging status detection unit 3 which detects the clogging status of the dust filter on the basis of the component temperature threshold values 19 and component temperatures 14 inside the information processing device.

[Selected drawing] FIG. 1



[Scope of patent claims]

[Claim 1]

A dust filter clogging status detection method for detecting clogging status of a dust filter inside an information processing device,

the dust filter clogging status detection method being characterized in that component temperature threshold values are generated for multiple components making up the information processing device by means of an information processing unit inside the information processing device on the basis of standard component temperature information for multiple components making up the information processing device, system information for the information processing device, and information indicating the internal status of the information processing device; and clogging status of the dust filter is detected on the basis of the component temperature threshold values and component temperatures inside the information processing device.

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[Claim 2]

The dust filter clogging status detection method according to claim 1, characterized in that:

the standard component temperature information for the multiple components making up the information processing device, corresponding to combinations of system information of the information processing device and information indicating the internal status of the information processing device, is stored in advance in an information storage unit inside the information processing device; and

the standard component temperature information stored in the information storage unit is selected and the component temperature threshold values are generated by the information processing unit on the basis of the system information for the information processing device and the information indicating the internal status of the information processing device.

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[Claim 3]

A dust filter clogging status detection device for detecting clogging status of a dust filter inside an information processing device, characterized in that it comprises:

a component temperature threshold value generating unit which, on the basis of standard component temperature information for multiple components making up the information processing device, system information of the information processing device, and information indicating the internal status of the information processing device, generates component temperature threshold values for the multiple components making up the information processing device; and

a clogging status detection unit which detects the clogging status of the dust filter on the basis of the component temperature threshold values and component temperatures inside the information processing device.

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[Claim 4]

The dust filter clogging status detection device according to claim 3, characterized in that it comprises:

an information storage unit which stores the standard component temperature information for the multiple components making up the information processing device, corresponding to combinations of system information of the information processing device and information indicating the internal status of the information processing device;

wherein the component temperature threshold value generating unit selects the standard component temperature information stored in the information storage unit and generates the component temperature threshold values on the basis of the system information for the information processing device and the information indicating the internal status of the information processing device.

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[Detailed description of the invention]

[Technical field]

[0001]

The present invention relates to a dust filter clogging status detection method and dust filter clogging status detection device for detecting clogging status of dust filters inside information processing devices such as PCs and server systems, and particularly relates to technology for detecting clogging status on the basis of system information of the information processing device.

[Background art]

[0002]

Conventionally, in PC and server systems, in conjunction with system performance improvements, heat generation tends to increase, and the air flow needed to cool devices also tends to increase. Furthermore, with the proliferation of PC and server systems, installation locations have become more diverse, leading to widespread adoption of dust filters that prevent dust penetration through ventilation ports.

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[0003]

Techniques for detecting clogging of such dust filters include, for example, the technique described in Japanese Unexamined Patent Application Publication 2006-198582 (patent document 1).

[Patent document 1] Japanese Unexamined Patent Application Publication 2006-198582

[Disclosure of the invention]

[Problem to be solved by the invention]

[0004]

However, the technique in patent document 1 involves detecting clogging based on fan rotational speed/temperature difference before vs. after the filter. However, when considering application to PC/server systems, differences in internal temperature change due to load and configuration differences of the CPU/memory/HDD, etc. are not taken into consideration, and when considering application to PC/server systems where loads and configurations differ depending on time and user, there is the problem that setting temperature threshold values is difficult.

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[0005]

Therefore, is an object of the present invention to provide a dust filter clogging status detection method and dust filter clogging status detection device that make it possible to detect dust filter clogging status more accurately by using system load/configuration information.

[0006]

The above and other objects and novel features of the present invention should become apparent from the description in the present specification and the appended drawings.

[Means for solving the problem]

[0007]

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A summary of the representative aspects of the invention disclosed in the present application may be briefly presented as follows.

[0008]

Namely, the summary of the representative aspects comprises a component temperature threshold value generating unit which, on the basis of standard component temperature information for multiple components making up an information processing device, system information for the information processing device, and information indicating the internal status of the information processing device, generates component temperature threshold values for the multiple components making up the information processing device; and a clogging status detection unit which detects the clogging status of the dust filter on the basis of the component temperature threshold values and component temperatures inside the information processing device.

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[Effect of the invention]

[0009]

The representative effect provided by the invention disclosed in the present application may be briefly described as follows.

[0010]

Namely, the effect provided by the representative aspects is that dust filter clogging status can be more accurately detected using system load/configuration information.

[Best mode for carrying out the invention]

[0011]

Embodiments of the present invention will be described in detail below based on the drawings. It should be noted that in all the drawings intended to explain the embodiments, identical components will, as a rule, be assigned an identical reference symbol, and repeated description thereof will be omitted.

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[0012]

The configuration of a dust filter clogging status detection device according to one embodiment of the present invention will be described using FIG. 1. FIG. 1 is a configuration diagram illustrating the configuration of a dust filter clogging status detection device according to one embodiment of the present invention.

[0013]

In FIG. 1, the dust filter clogging status detection device comprises: an information storage unit 1 which stores standard component temperature information for multiple components making up the information processing device corresponding to combinations of system information of information processing devices such as PC/server systems and information indicating the internal status of the information processing device; a component temperature threshold value generating unit 2 which generates component temperature threshold values for multiple components making up the information processing device on the basis of standard component temperature information for multiple components making up the information processing device, system information of the information processing device, and information indicating the internal status of the information processing device; a clogging status detection unit 3 which

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detects the clogging status of the dust filter on the basis of component temperature threshold values and component temperatures inside the information processing device; a clogging status display unit 4; a system information acquisition unit 5; a temperature sensor information acquisition unit 6; and an error information detection unit 7.

[0014]

Furthermore, the dust filter clogging status detection device is configured as part of an information processing device such as a PC/server system, and the information processing device has information processing functions such as CPU/HDD/memory, with the information storage unit 1 of the dust filter clogging status detection device comprising an HDD, etc., and the component temperature threshold value generating unit 2, clogging status detection unit 3, system information acquisition unit 5, temperature sensor information acquisition unit 6, and error information detection unit 7 being processed through processing by an information processing unit comprising a CPU, etc.

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[0015]

The information storage unit 1 stores system information 8 (actual fan rotational speed 9, hardware configuration 10, load 11), temperature sensor information 12 (ambient temperature 13, component temperature 14), standard component temperature 15, error information 16 (fan error 17, voltage error 18), component temperature threshold values 19, actual component temperature/component temperature threshold value ratio 20, clogging status table 21, and clogging status information/error information 22.

[0016]

The actual fan rotational speed 9 is the actual rotational speed of each fan installed in the system. The hardware configuration 10 is system configuration information for CPU/memory/HDD/expansion boards/expansion drives. Load 11 is load information for CPU/memory/HDD/expansion drives.

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[0017]

Ambient temperature 13 is temperature information for the ambient environment of the system. Component temperature 14 is temperature information for main components such as CPU, memory/HDD/ICs, etc.. Standard component temperature 15 is information on standard component temperatures for each ambient temperature 13, hardware configuration 10, load 11, and actual fan rotational speed 9.

[0018]

Fan error 17 is information recorded when fan rotational speed becomes an abnormal rotational speed due to fan malfunction, etc. Voltage error 18 is information stored when voltage generated inside the information processing device becomes an abnormal voltage.

[0019]

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Component temperature threshold value 19 is temperature threshold value information for CPU/memory/HDD/other ICs, etc. The actual component temperature/component temperature threshold value ratio 20 is the ratio of actual component temperature to component temperature threshold value.

[0020]

The clogging status table 21 is a table showing clogging status and message information for each average value of actual component temperature/component temperature threshold value ratios. Clogging status information/error information 22 is clogging status information/error information of the information processing device.

[0021]

Next, the various information used in the dust filter clogging status detection device according to one embodiment of the present invention will be described using FIG. 2 to FIG. 7. FIG. 2 shows an example of system information used in the dust filter clogging status detection device according to one embodiment of the present invention, with FIG. 2 (a) showing hardware configuration, FIG. 2 (b) showing actual fan rotational speed, and FIG. 2 (c) showing load information.

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[0022]

FIG. 3 shows an example of standard component temperatures used in the dust filter clogging status detection device according to one embodiment of the present invention; FIG. 4 shows an example of component temperature threshold values used in the dust filter clogging status detection device according to one embodiment of the present invention; FIG. 5 shows an example of actual component temperature/component temperature threshold value ratios used in the dust filter clogging status detection device according to one embodiment of the present invention; FIG. 6 shows an example of a clogging status table used in the dust filter clogging status detection device according to one embodiment of the present invention; and FIG. 7 shows an example of clogging status/error information used in the dust filter clogging status detection device according to one embodiment of the present invention.

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[0023]

As shown in FIG. 2, system information 8 consists of actual fan rotational speed 9, hardware configuration 10, and load 11 information, with hardware configuration 10 consisting of information on CPU, memory, HDD, expansion slots, expansion drives, etc. Actual fan rotational speed 9 is the ratio of actual rotational speed to maximum rotational speed for each fan installed in the system. Load 11 represents the ratio of actual load to maximum load for each of CPU, memory, HDD, and drive.

[0024]

Standard component temperature 15, as shown in FIG. 3, is multiple items of information prepared during the design/development phase and stored in the information storage unit 1, being information consisting of all combinations of ambient temperature, configuration, load, and fan rotational speed. Using this standard component temperature 15, a standard component temperature for detecting dust filter clogging status can be acquired based on the configuration of the information processing device and various internal information of the information processing device.

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[0025]

The component temperature threshold value 19, as shown in FIG. 4, is obtained by extracting component temperatures applicable to the current system status from standard component temperature 15, and is composed of ambient temperature, configuration, load, actual fan rotational speed, and standard component temperature. The standard component temperature information within the component temperature threshold value 19 becomes the component temperature threshold value used when detecting dust filter clogging status.

[0026]

The actual component temperature/component temperature threshold value ratio 20, as shown in FIG. 5, represents the ratio of actual component temperature to component temperature threshold value for CPU, memory HDD, and IC 1 to IC 4, and is composed of CPU temperature ratio, memory temperature ratio, HDD temperature ratio, IC 1 to 4 temperature ratio, and average value.

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[0027]

The clogging status table 21, as shown in FIG. 6, is prepared in advance during the design/development phase and stored in the information storage unit 1, and is composed of clogging status and messages for each average value of actual component temperature/temperature threshold values.

[0028]

Clogging status information/error information 22, as shown in FIG. 7, is composed of clogging status and messages as in clogging status/error information (example 1) 51. When error information exists, it is composed of error information and content indicating that clogging cannot be detected, as in clogging status/error information (Example 2) 52.

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[0029]

Next, the dust filter clogging status detection operation of the dust filter clogging status detection device according to one embodiment of the present invention will be described using FIG. 8. FIG. 8 is a flowchart showing the dust filter clogging status detection operation of the dust filter clogging status detection device according to one embodiment of the present invention.

[0030]

First, system information acquisition unit 5 acquires system information from the operating system, etc. and stores system information 8 in the information storage unit 1 (step 100), temperature sensor information acquisition unit 6 acquires temperature sensor information from temperature sensors, etc. and stores temperature sensor information 12 in the information storage unit 1 (step 101), and error information detection unit 7 acquires error information and stores error information 16 in the information storage unit 1 (step 102).

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[0031]

Then, component temperature threshold value generating unit 2 acquires system information 8 from the information storage unit 1 (step 103), acquires temperature sensor information 12 (step 104), acquires standard component temperature 15 (step 105), selects standard component temperature 15 matching the system information 8 of the current information processing device and temperature sensor information 12 from standard component temperature 15, copies this as component temperature threshold value 19, and stores it in the information storage unit 1 (step 106).

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[0032]

Then, clogging status detection unit 3 acquires component temperature 14 (step 107), acquires component temperature threshold value 19 (step 108), acquires error information (step 109), and acquires clogging status table 21 from the information storage unit 1 (step 110).

[0033]

The actual component temperature/component temperature threshold value ratio 20 is then calculated based on the component temperature 14 and component temperature threshold value 19, and stored in the information storage unit 1 (step 111).

[0034]

Then, clogging status information/error information 22 is generated from error information 16, clogging status table 21, and the average value of actual component temperature/component temperature threshold value ratios 20, and is stored in the information storage unit 1 (step 112).

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[0035]

Then, the clogging status display unit 4 acquires clogging status information/error information 22 from the information storage unit 1 and displays this information (step 113).

[0036]

As described above, in the present embodiment, the component temperature threshold value generating unit 2 calculates component temperature threshold values 19 from ambient temperature 13, actual fan rotational speed 9, hardware configuration 10, and load 11, and the clogging status detection unit 3 calculates clogging status from component temperature 14, component temperature threshold value 19, and error information 16 and displays the clogging status on the clogging status display unit 4, making it possible to calculate the clogging status more accurately based on the hardware configuration of the information processing device and current internal information of the information processing device.

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[0037]

The invention made by the present inventors was described above concretely based on embodiments of the invention, but the present invention is of course not limited to the above embodiments and can be modified in various ways without departing from the gist of the invention.

[0038]

For example, in the present embodiment, component temperature threshold values 19 are created by selecting a standard component temperature 15 matching system information 8 and temperature sensor information 12 from standard component temperatures 15 consisting of multiple combinations, but the standard component temperature information could alternatively be converted to a database of standard component temperatures corresponding to hardware configuration, load, and actual fan rotational speed, and component temperature threshold values 19 could be calculated by searching this database based on current information processing device information.

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[Industrial applicability]

[0039]

The present invention is widely applicable to information processing devices which have an internal dust filter and detect the clogging status of that filter.

[Brief description of the drawings]

[0040]

[FIG. 1] is a configuration diagram illustrating the configuration of a dust filter clogging status detection device according to one embodiment of the present invention.

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[FIG. 2] shows an example of system information used in the dust filter clogging status detection device according to one embodiment of the present invention.

[FIG. 3] shows an example of standard component temperatures used in the dust filter clogging status detection device according to one embodiment of the present invention.

[FIG. 4] shows an example of component temperature threshold values used in the dust filter clogging status detection device according to one embodiment of the present invention.

[FIG. 5] shows an example of actual component temperature/component temperature threshold value ratios used in the dust filter clogging status detection device according to one embodiment of the present invention.

[FIG. 6] shows an example of a clogging status table used in the dust filter clogging status detection device according to one embodiment of the present invention.

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[FIG. 7] shows an example of clogging status information/error information used in the dust filter clogging status detection device according to one embodiment of the present invention.

[FIG. 8] is a flowchart showing the dust filter clogging status detection operation of the dust filter clogging status detection device according to one embodiment of the present invention.

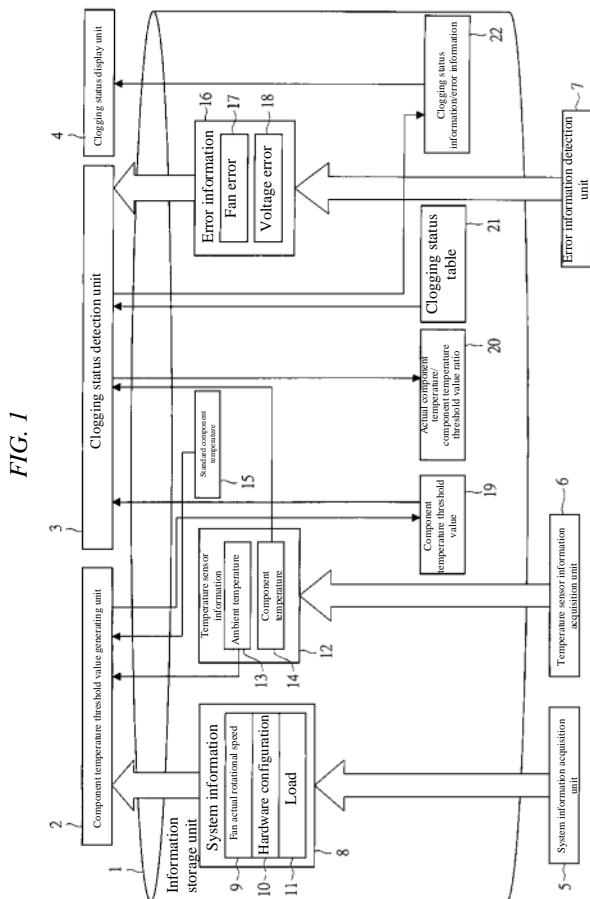
[Description of reference symbols]

[0041]

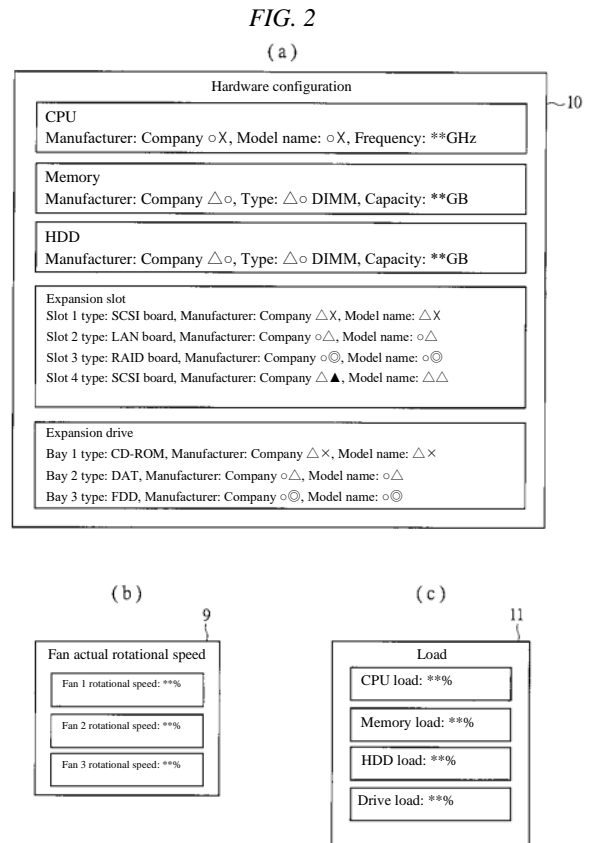
1...information storage unit; 2...component temperature threshold value generating unit; 3...clogging status detection unit; 4...clogging status display unit; 5...system information acquisition unit; 6...temperature sensor information acquisition unit; 7...error information detection unit; 8...system information; 9...actual fan rotational speed; 10...hardware configuration; 11...load; 12...temperature sensor information; 13...ambient temperature; 14...component temperature; 15...standard component temperature; 16...error information; 17...fan error; 18...voltage error; 19...component temperature threshold value; 20...actual component temperature/component temperature threshold value ratio; 21...clogging status table; 22...clogging status information/error information.

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[FIG. 1]

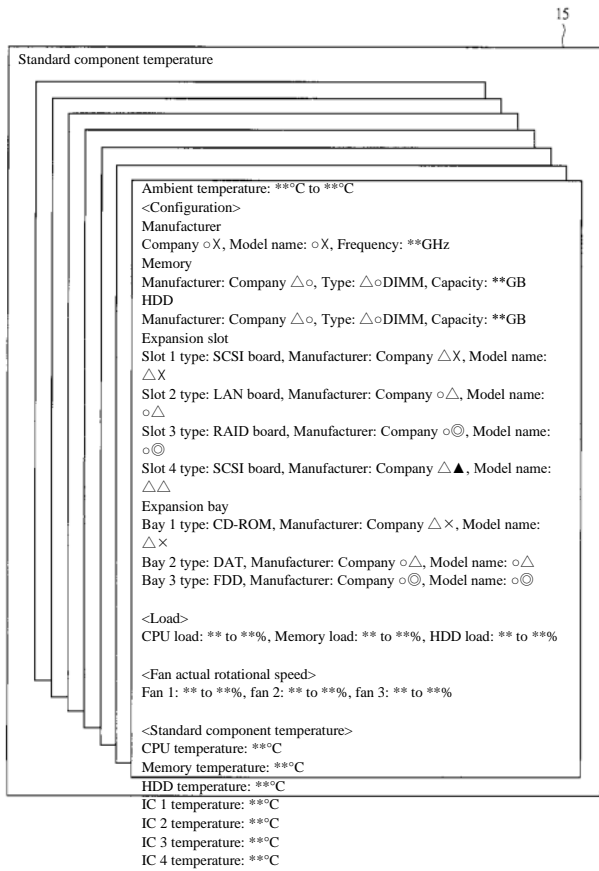


[FIG. 2]



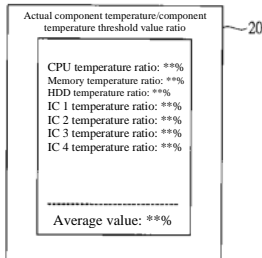
[FIG. 3]

FIG. 3



[FIG. 5]

FIG. 5



[FIG. 6]

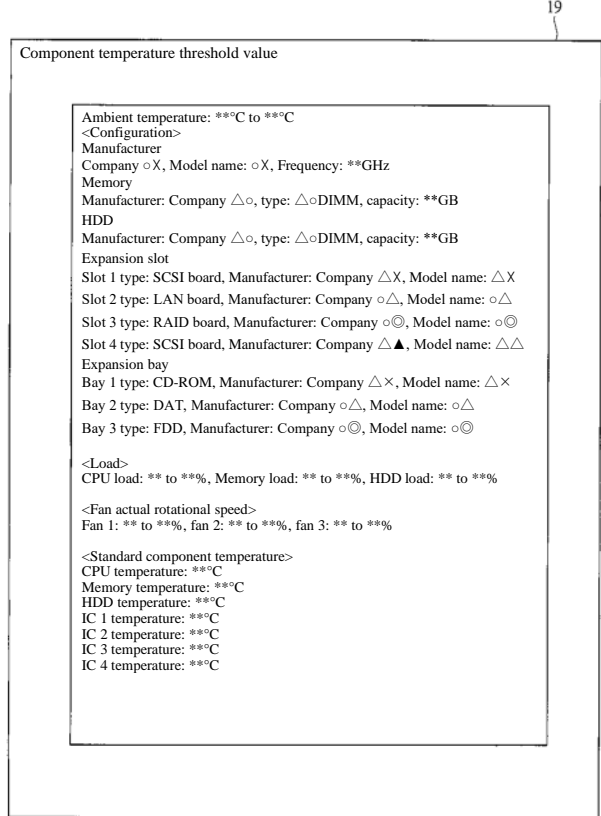
FIG. 6

Clogging status table		
Actual temperature/temperature threshold value average value	Clogging status	Message
~%	~30%	No problems.
~%	30~70%	Please prepare to replace the filter.
~%	70~100%	Please replace the filter immediately.

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[FIG. 4]

FIG. 4



[FIG. 7]

FIG. 7

