Preface

The "K" supercomputer was ranked No. 1 amongst the world's top 500 supercomputers in June and November 2011. We delivered a combined heat and power (CHP), consisting of two 6 MW class gas turbines, as part of the electrical facility for the "K."

The CHP introduced into the "K" facility not only serves the purpose of reducing contracted demand by means of peak shaving and energy-saving but also protects the power supply to the supercomputer. This is the first time that we have applied a CHP for the purpose of protecting the power supply of a data-processing center.

In this article, we report our contribution to the power supply of the "K" via the power supply protection system for the "K" and the energy-saving measure.

to maintain the voltage of the generator bus within 80% should an instantaneous voltage drop occur and to complete cut-off from the power system within 20 ms. In response to this necessity, a system of measures against an instantaneous voltage drop incorporating a high-speed current-limiting circuit breaker was devised. Fig. 2 shows the diagram of the system configuration.

In comparison with existing measures, this system allows important units such as file servers to be protected while containing the installation and maintenance expenses for the backup power supply and reducing the installation space.

(2) Introduction of energy-saving technology for an eco-supercomputer facility

One of concepts for the facilities of the "K" supercomputer is an "eco-supercomputer." Kawasaki's CHP uses a power generation system consisting of gas turbines and steam absorption chillers that runs on gas turbine exhaust gas,