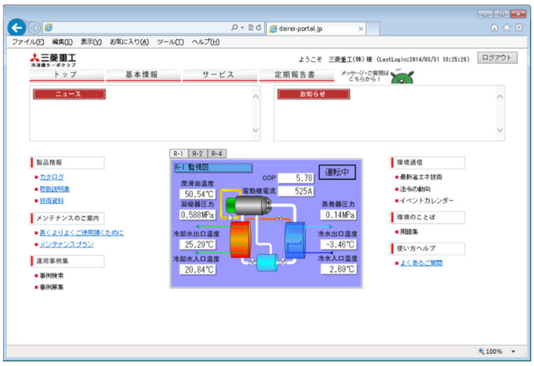
Improvement of Remote Monitoring Service for Centrifugal Chiller Driving Situation



Sales Department
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In recent years, demand for energy-saving operation of individual centrifugal chillers has been increasing in response to growing requests for the improvement of the energy-saving characteristics of air conditioning facilities. For this reason, the capability of allowing customers to be aware of the operating state of the chiller in real time remotely from their offices, headquarters and other places has been an important need. In order to meet this requirement, Mitsubishi Heavy Industries, Ltd. (MHI) has developed a chiller operating data browsing system that uses the ubiquitous Internet environment. This paper presents the developed system.

1. Introduction

Currently MHI offers remote chiller monitoring services using the public telephone network (MODEM (Modulator-Demodulator)) and an Internet line (web logger), but the use of an Internet line has been prevalent due to the requests of customers for real time monitoring and changes in the communication environment. In addition to monitoring the operating state of the chiller, demand for proposals and support for the optimum operation of the chiller based on the collected data has recently been increasing.

As such, MHI has developed a chiller operating data browsing system named "Centrifugal Chiller Club" that enables web-based remote monitoring in order to expand the services of the monitoring system through an Internet line (VPN (Virtual Private Network)). On this website, customers can browse specifications, periodic reports and the maintenance history, in addition to the operating data, of the chillers delivered by MHI.

2. Features of product

(1) Browsable information

The "Centrifugal Chiller Club" web-based remote monitoring system offers customers a service that enables not only the ability to browse the operating state of the chiller, but also download periodic reports and review its maintenance status.

- Awareness of operating state

  Customers can check the start/stop state and the main temperature and pressure values of the chiller on the schematic diagram (Title figure) (**Figure 1**).

- Periodic report

  As shown in Figure 1, the operating data of the chiller are displayed in charts, and the average values for the day and data at any five time points are also indicated in the daily report (**Figure 2**). Daily reports, weekly reports and monthly reports are available as periodic reports. The operating state can be summarized immediately because a report is created automatically on the day after the operating day for a daily report (Sunday or Monday each week for weekly reports and the 1st day of the month each month for monthly reports). The daily report presents the COP (Coefficient Of Performance) and the load factor on a chart, in addition to temperature and pressure values, and therefore changes in the operating load can be easily reviewed.

・ Maintenance state

Necessary maintenance items for the targeted chiller are shown in calendar form, and therefore the maintenance execution history and the future plan can be checked at a glance (**Figure 3**).

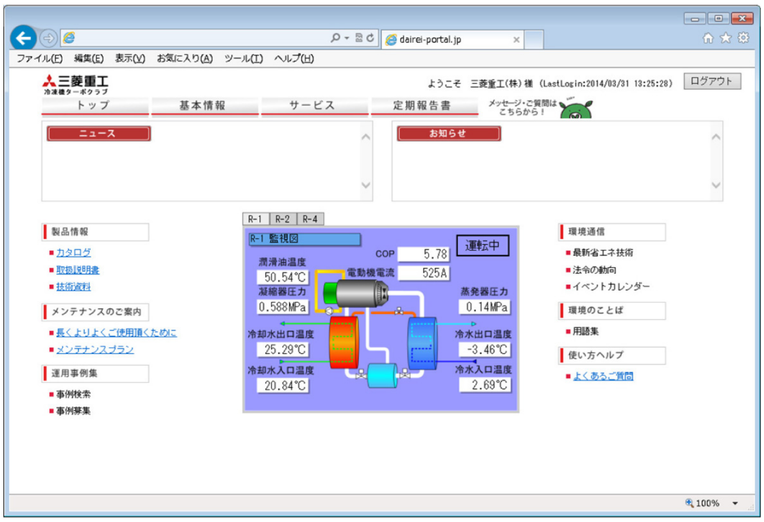

Figure 1 Awareness of operating state

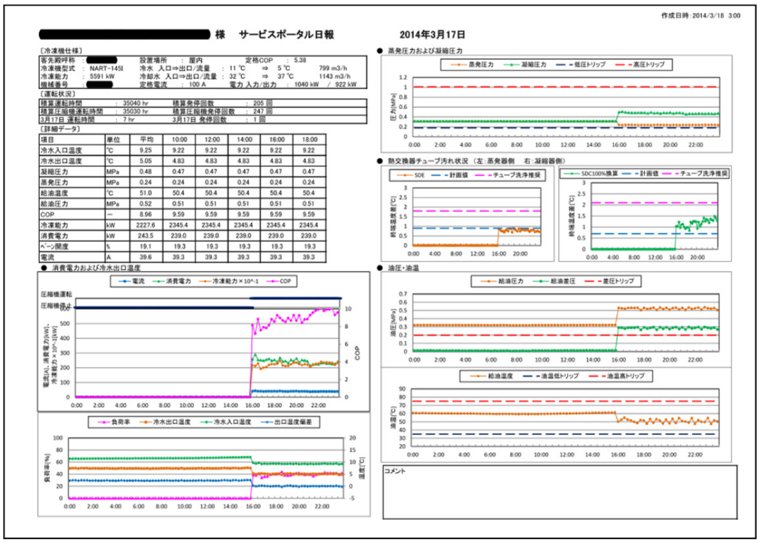

Figure 2 Periodic report (daily report)
Operating data of the chiller are displayed in charts, and the average values of the day and data at any five time points are reported.

Figure 3 Maintenance calendar screen
Necessary maintenance items for the chiller are shown in calendar form, and therefore the execution history and the future plan can be checked at a glance.

(2) Communication structure of remote monitoring system

Operating data from each chiller are collected using a VPN environment on a dedicated Internet line (**Figure 4**). The "Centrifugal Chiller Club" web-based remote monitoring system can be browsed through the common Internet using an ID and a password issued to customers individually.

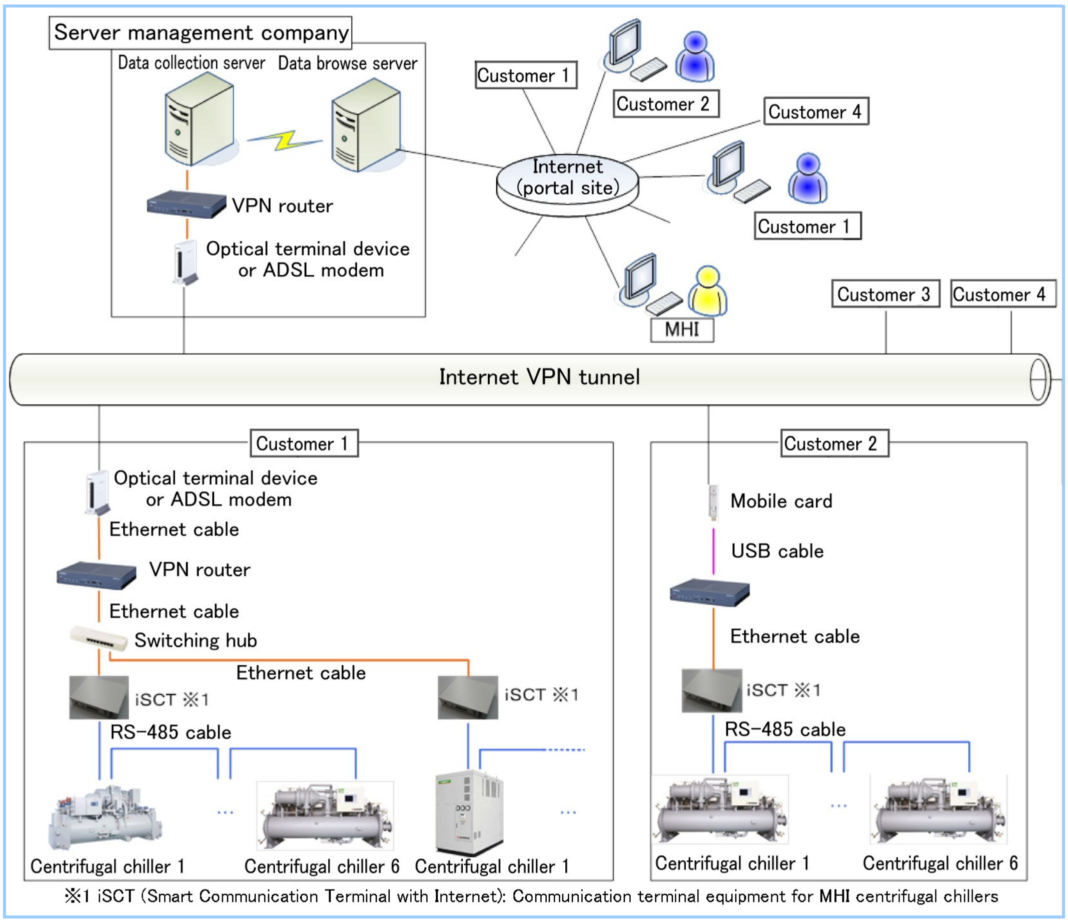

Figure 4 Communication structure diagram of remote monitoring
This simplified diagram summarizes the communication structure between chillers and the monitoring site.

3. Future prospects

MHI plans to not only propose and support the optimum operation of the chiller based on the data collected through the "Centrifugal Chiller Club" web-based remote monitoring system, but also use the data for the proposal of energy-saving measures and the support of the optimum operation of the entire air conditioning system. In addition, MHI will disclose necessary maintenance items for the long-term operation of chillers, thereby enabling the proposal of long-term maintenance schedules to customers.