

New Heat Source Control Panel “Ene-Conductor” Model Contributes to Energy Saving by Achieving Optimal Control for Wide Range of Heat Source Systems



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The heat source control panel “Ene-Conductor” developed by Mitsubishi Heavy Industries Thermal Systems, Ltd. is a product for controlling the number of centrifugal chillers and auxiliary equipment such as pumps for optimal operation of a heat source system by taking into account the COP characteristics of centrifugal chillers. Ene-Conductor has contributed to energy saving in over 100 heat source systems of customers from 2010, when sales started, to 2024. To support overseas heat source systems and respond to the needs for various communication specifications, we added a new model, “EC-8,” to the lineup. We will supply more Ene-Conductors and centrifugal chillers to the global market to contribute to energy saving in heat source systems including centrifugal chillers in a variety of countries.

1. Introduction

To apply Ene-Conductor to a wide range of heat source systems, we standardized the control program by defining a standard configuration and have provided reliable products to customers.

In recent years, the need for energy saving control in heat source systems has been growing both in Japan and abroad. Customers are promoting the optimization of energy use in entire buildings including heat source systems by introducing energy management systems. In such cases, the communications protocol used in energy management systems differs depending on the scale and intended use of such systems.

On the other hand, the configuration of heat source system differs between Japan and overseas and there was difficulty in applying conventional Ene-Conductor models “EC-3” and “EC-6” to overseas heat source systems. In addition, communication systems supported by conventional Ene-Conductor models were limited.

As such, we developed a new Ene-Conductor model, “EC-8,” which can be applied to overseas heat source systems and various communication specifications.

2. Product specifications

The control panel size of the new “EC-8” is the same as that of the conventional “EC-6” (Figure 1). For the touch panel of “EC-8”, we adopted a 12.1-inch panel, which was larger than the conventional 10.1-inch panel, in consideration of customers’ usability and visibility.

We offer a lineup of three models: “EC-8,” which can control up to eight centrifugal chillers, and the conventional “EC-3” and “EC-6” (Table 1).

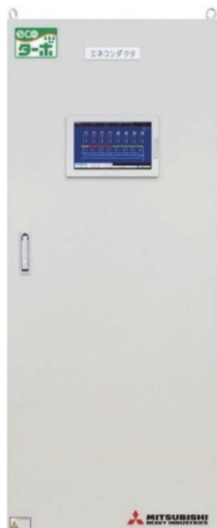


Figure 1
Appearance of Ene-Conductor

Table 1 Specifications of Ene-Conductor

Item	Model: EC-8	Model: EC-3	Model: EC-6
Target equipment	Heat source system comprised of centrifugal chillers manufactured by MTH and air-cooled heat pumps (Option: Chillers manufactured by other companies applicable)		
Number of chillers that can be controlled	1 to 8	1 to 3	1 to 6
Control functions	For optimal control of the heat source equipment, the following seven functions are provided: (1) Control of number of chillers (2) Chilled water variable flow control (3) Cooling water variable flow control (4) Cooling tower control (5) Cooling water bypass valve control (6) Main pipe bypass valve control (7) Secondary chilled/hot water pump control		
Outside dimensions	Width (W)	800 mm	700 mm
	Height (H)	1800 mm	1300 mm
	Depth (D)	500 mm	350 mm
Weight	Approx. 240 kg	Approx. 130 kg	Approx. 240 kg
Power specification	Single-phase 100V to 240V, 50Hz/60Hz shared	Single-phase 100V to 125V, 50Hz/60Hz shared (Option: Single-phase 200V class)	
Installation method	Free-standing	Wall-hanging (Option: Free-standing rack available)	Free-standing

3. Target equipment configuration

Figure 2 shows the system diagram of a heat source system to which “EC-8” is applicable. In overseas heat source systems, the mainstream system is one in which primary chilled/hot water pumps and cooling water pumps are combined for common use by header pipes, respectively (hereinafter referred to as common pump system). EC-8 can be applied to the common pump system as well as the system in which one primary chilled/hot water pump and one cooling water pump are installed in one heat source machine (hereinafter referred to as individual pump system) (Figure 3). “EC-3” and “EC-6” can be applied only to an individual pump system.

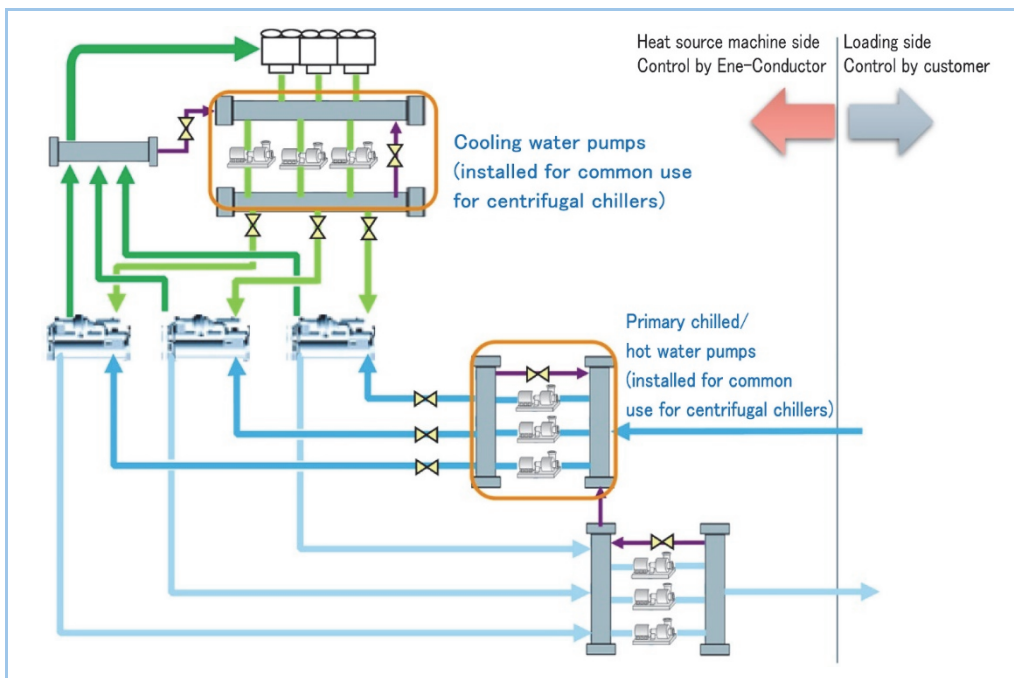


Figure 2 Schematic diagram of heat source system with common pump system

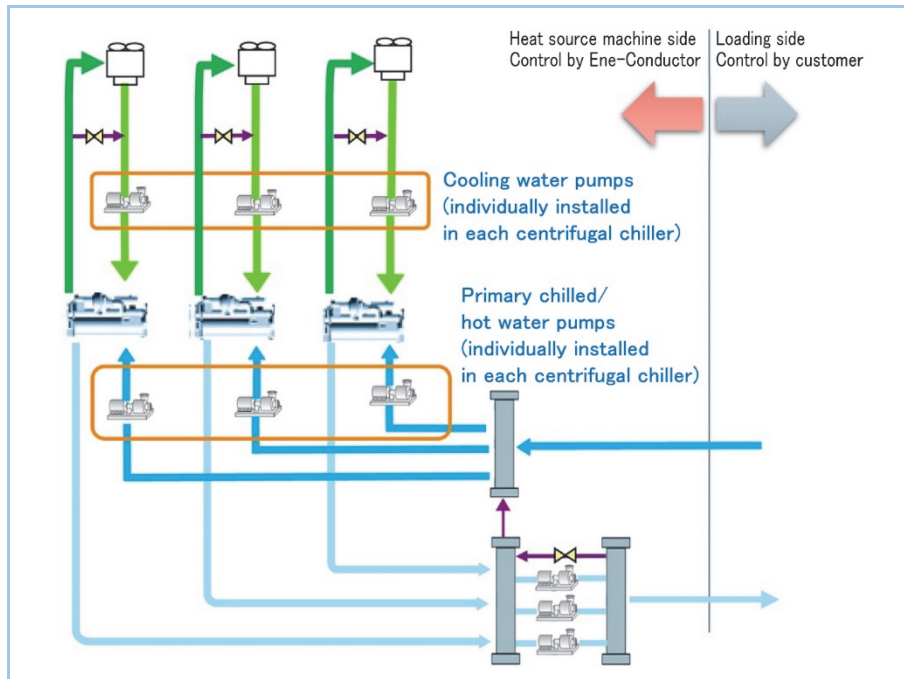


Figure 3 Schematic diagram of heat source system with individual pump system

4. Communication specifications

If a customer has higher-level equipment such as a central monitor, the customer can collectively obtain, through communication, information about centrifugal chillers and auxiliaries that the Ene-Conductor controls, equipment sensor values, etc. Therefore, the customer can monitor equipment condition and visualize data about the heat source equipment.

When “EC-8” and the higher-level equipment are linked, the communications protocols that can be used with the “EC-8” are MODBUS/TCP, MODBUS/RTU and BACnet/IP (**Figure 4**). “EC-8” enables not only the output of equipment operating states, control instruction values, etc., to the customer but also the input of operation commands, equipment sensor values, etc., by the customer. This allows a reduction of signal wires, leading to a reduction in construction costs.

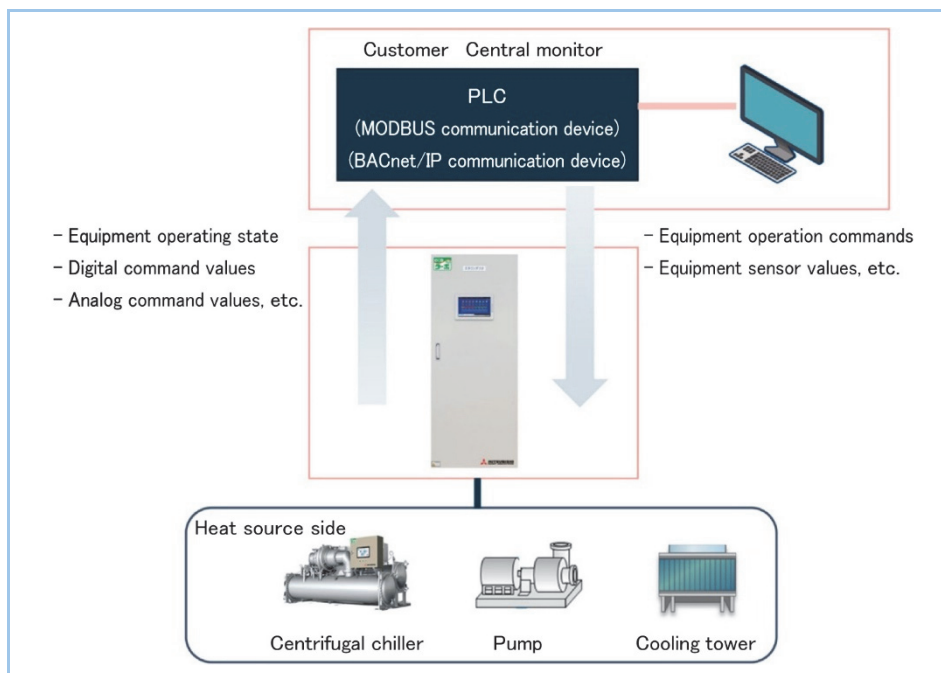


Figure 4 Communication system configuration

5. Introduction example/effects

As an overseas introduction example^{*1}, the Ene-Conductor we delivered to Sony Device Technology (Thailand) Co., Ltd. (hereinafter referred to as SDT) and its effects are described.

SDT's heat source system consists of four inverter centrifugal chillers and all of their auxiliaries are also equipped with inverters. As a result of the introduction of Ene-Conductor and centrifugal chillers into this system, high efficiency of the annual system COP 4 to 5, was achieved. In addition, the annual power consumption was reduced by approximately 30% from that of the system with fixed-speed centrifugal chillers and auxiliaries. As a result, CO₂ emissions were also reduced by approximately 30%.

These results verified that even in Southeast Asia where the outside air temperature is high throughout the year, our Ene-Conductor and centrifugal chillers are effective in energy saving in a heat source system.

^{*1} Article on introduction example

<https://solutions.mhi.com/case-studies/energy-saving-with-visualizing-operating-status-of-entire-chiller-system/>

6. Future development

Ene-Conductor, which centrally controls a heat source system, is a product that contributes to the realization of a carbon-neutral society. Utilizing our expertise as a manufacturer of centrifugal chillers, we will develop Ene-Conductor into a versatile product that can be applied to systems including water/heat storage tanks and aquifers.