

Steam Star MSEG Series Screw-type Compact Steam-powered Generator

Features

- A compact generator with a capacity of 100 to 160 kW, and yet its power generation efficiency is as high as that of 10,000-kW-class thermal power plants.
- Incorporates a control function to maintain constant pressure, and generates power continuously according to the steam supply rate of 10% to 100% under constant decompression control, thus replacing existing decompression valves.
- The generators generate 100 to 160 kW of power from approximately 3 to 5 ton/h of steam – even small-scale factories can save energy and reduce CO₂ by up to 500 tons every year.

Overview

(Technical principles, actions, etc.)

The equipment is a world-class and high-efficiency screw-type compact generator powered by steam, and leverages the energy generated by depressurizing a small amount of steam at less than 20 bar produced at a flow rate of less than 3 tons/hour by a low-pressure, small-scale boiler.

Figure 1 shows the schematic diagram of the equipment. The steam supplied by the boiler is drained off through the drain separator and introduced into the screw-type expander via a flow regulator incorporating an emergency shutoff valve and a flow regulating function. The energy generated by the isentropic expansion of the steam is converted to electric energy by the generator.

The screw-type expander has the advantage of producing torque efficiently from a low flow rate of steam, and generates power of 100 to 160 kW from steam at a supply rate of 3 to 5 ton/h. The inverter controls the number of revolutions of the generator. It also controls the number of revolutions of the expander to maintain the supply and exhaust pressures of the steam at a constant level and generate power according to the quantity of steam. Therefore, the equipment can continuously generate power according to a steam volume that fluctuates between 10% and 100%.

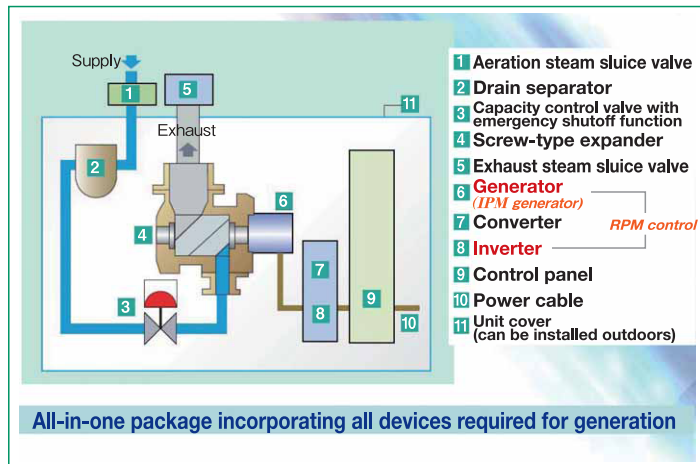
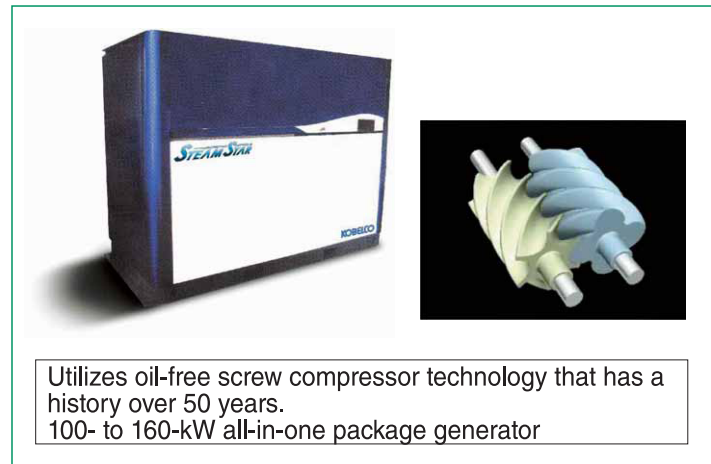


Fig. 1 Equipment configuration of Steam Star



Screw-type compact steam generator

Introductory Track Record

As of March 2014

- In Japan: 100 units
- Korea: 10 units

Effects

○ The Steam Star generates power according to the quantity of steam, but the required flow rate of steam is in a low range.

There are Japanese factories that use 250,000 small-scale through flow boilers. The Steam Star can be introduced into these factories to save energy and reduce CO₂ emissions.

The Steam Star makes it possible to generate power from steam energy that has not been utilized effectively in the past. By operating the Steam Star to generate 160 kW for 8,000 hours annually, it will be possible to save 1,280,000 kWh per year. This will result in an economic effect of saving an annual running cost of 19,200,000 yen (on the condition that it costs 15 yen per kWh). Furthermore, approximately 500 tons of CO₂ can be saved each year (with a CO₂ emission coefficient of 0.555 kg-CO₂/kWh applied).

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