

FACTORY AUTOMATION

E800 NEWS

Energy savings

Vol. 04

Energy and power savings for carbon neutrality

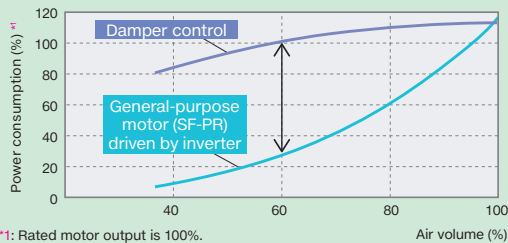


Energy and power savings lead to carbon neutrality.

1 Energy savings with inverters

Compared to commercial power supply operation, significant energy savings can be gained by decreasing the rotation speed. The consumed power of a square variable-torque load, such as fans, pumps, and blowers, is proportional to the cube of its rotation speed. This means that controlling the rotation speed to adjust the air volume can lead to energy savings.

Example of blower operation characteristic



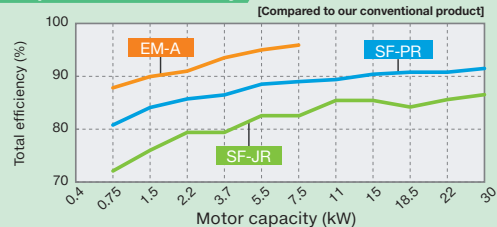
*1: Rated motor output is 100%.

2 Further energy savings with high-efficiency motors

In the international context of global warming prevention, many countries in the world have started to introduce laws and regulations to mandate manufacturing and sales of high-efficiency motors. With the use of high-efficiency motors, further energy saving is achieved.

IE3: SF-PR premium efficiency motor (induction motor)
IE5: EM-A ultra-premium efficiency motor*2 (magnet motor)

Comparison of efficiency



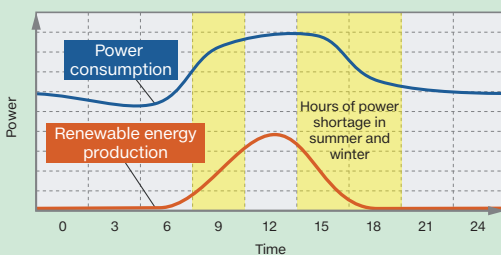
*2: Magnet motor having Mitsubishi Electric's unique salient core and permanent magnets.

3 Energy-saving operation for low power supply

Using the inverter's PLC function and cooperating with control devices can control the motor speed to reduce power consumption during hours of power shortage due to low renewable energy production.

Using inverters to control speed according to the conditions enables energy-saving operation, which is difficult to perform with damper control.

Example of energy-saving operation for low power supply



For detailed information on power demand and supply, refer to electricity forecast provided by electric power suppliers.

4 Energy saving at a glance

Energy saving monitor is available. The energy saving effect can be checked using an operation panel, output terminal, or network.

The output power amount measured by the inverter can be output in pulses. The cumulative power amount can be easily checked. (This function cannot be used as a meter to certify electricity billings.)

Furthermore /

With the Mitsubishi Electric energy measuring module, the energy saving effect can be displayed, measured, and collected. Energy Saving Support Software "EcoAdviser" helps manage and reduce CO₂ emissions by collecting energy information.


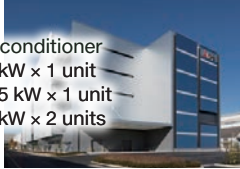
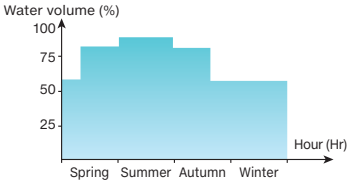

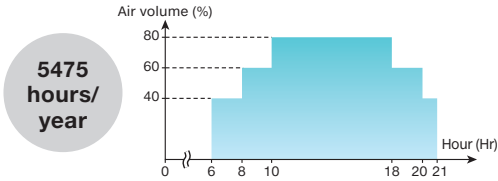

Energy Saving Supporting Devices

<https://www.mitsubishielectric.com/fa/products/pmng/ems/index.html>



5 Example of energy saving calculations

The longer the operating period with medium air volume is, the higher energy saving effect obtained with an inverter.
 (Conditions: The electricity cost is 16 yen/kWh. The CO₂ emission is 1,000 kWh 0.55 ton-CO₂)

	Water-cooling pump for a showcase	Air conditioning in a Mitsubishi Electric plant
	Commercial power supply (valve) + General-purpose motor (SF-PR) Inverter + General-purpose motor (SF-PR)	Inverter + General-purpose motor (SF-JR) Inverter + General-purpose motor (SF-PR)
Conditions	<p>Number of units</p> <ul style="list-style-type: none"> Water-cooling pump 2.2 kW × 2 units 	<p>Number of units</p> <ul style="list-style-type: none"> Ventilator 0.75 kW × 3 units 1.5 kW × 1 unit 2.2 kW × 3 units Air conditioner 15 kW × 1 unit 18.5 kW × 1 unit 30 kW × 2 units 
Operation patterns	<p>8760 hours/year</p>  <ul style="list-style-type: none"> With commercial power supply Approx. 40,000 kWh Approx. 640,000 yen With inverter Approx. 20,000 kWh Approx. 330,000 yen 	<p>5475 hours/year</p>  <ul style="list-style-type: none"> With SF-JR Approx. 247,000 kWh Approx. 3,930,000 yen With SF-PR Approx. 230,000 kWh Approx. 3,650,000 yen 
	<ul style="list-style-type: none"> Annual energy saving effect (difference) Approx. 20,000 kWh Approx. 310,000 yen Annual CO₂ emission reduction Approx. 20,000 kWh Approx. 10.7 ton 	<ul style="list-style-type: none"> Annual energy saving effect (difference) Approx. 17,000 kWh Approx. 280,000 yen Annual CO₂ emission reduction Approx. 17,000 kWh Approx. 9.5 ton
	Annual energy saving effect produced by adopting inverter control and magnetic motors	

For details, refer to the following documents.



Mitsubishi Electric
FR-E800 Inverter Catalog
Document number:
L(NA)06131ENG



E800 NEWS Vol. 01
Utilizing Ethernet
Document number:
L(NA)06137ENG



E800 NEWS Vol. 02
Application examples
Document number:
L(NA)06138ENG



E800 NEWS Vol. 03
Replacement
Document number:
L(NA)06139ENG



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