

Case	Application of Delta's Industrial Automation Products in HVAC: Energy-Saving Pump Solution				
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Applicable to	VFD series AC motor drive, DVP series PLC, DT series temperature controller, DOP series human machine interface				

70% of the monthly electricity consumption in a commercial building comes from central air-conditioning, and others come from illumination and other devices. Therefore, the most effective energy-saving solution in a building lies in the air-conditioning. To achieve efficient and energy-saving HVAC, Delta's solution integrates AC motor drive, PLC, temperature controller and human machine interface, offering economical, enviromental-friendly, stable and energy-saving solution for air-conditioning.

In early years with no frequency inverters, the flow of pump was controlled and regulated by throttle (See Figure1). Though the flow was regulated, the motor still ran in full speed, and therefore, no extra energy could be saved.

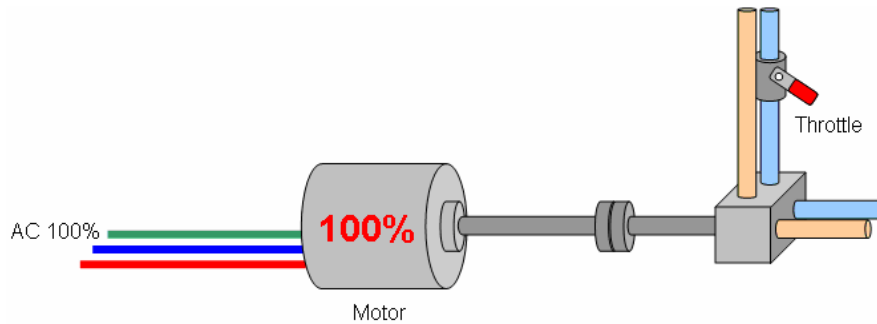


Figure 1

Delta's AC motor drive is able to regulate the running frequency of motor in different flow demands, not only regulating the flow but also achieving energy-saving effect (See Figure 2).

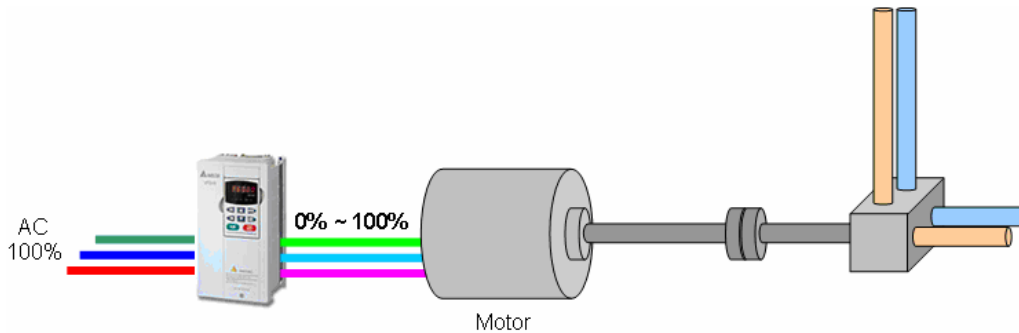


Figure 2

Table 1 below illustrates different power consumption under different running frequencies by motors of different horsepowers. Motors of bigger horsepower boost bigger energy-saving efficiency.

Frequency	60Hz	55Hz	50Hz	45Hz	40Hz	35Hz	30Hz
Power consumption (theoretical value)	100%	77%	57%	42%	30%	20%	13%
Power consumption (1hp)	100%	82%	74%	66%	59%	53%	47%
Power consumption (60hp)	100%	77.5%	60.6%	45%	32.4%	22.5%	15.4%
Power consumption (75hp)	100%	76.5%	58%	43%	31.2%	21.2%	15.3%

Table 1

However, in the circuit of a chilled water unit, the chilled water pump and cooling water pump are the devices utilizing the biggest horsepower in the entire system and having the biggest energy-saving efficiency. Therefore, these can be the first consideration to save energy. The temperature measurement module designed for Delta's programmable logic controller is able to detect the current air-conditioning load from the water outlet and water return pipe. With the load known, the analog output function then controls Delta's AC motor drive to further control the frequency of the motor in order to regulate the flow and save energy (See Figure 3).

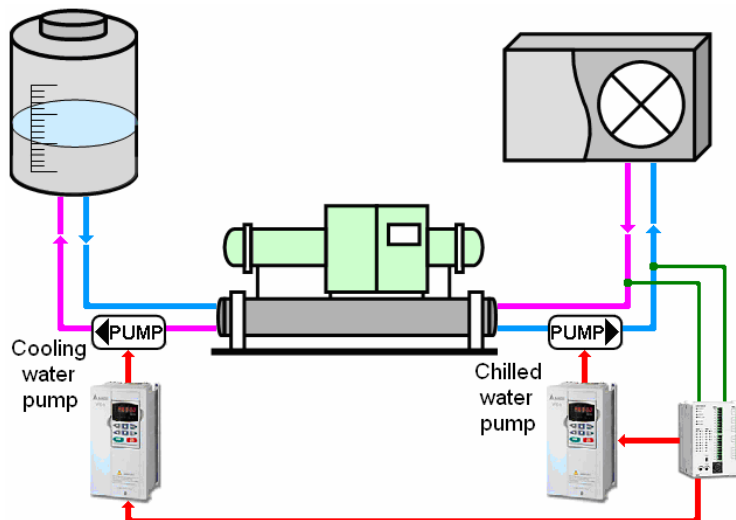


Figure 3

Devices in HVAC also include the fan in the air-conditioning case and fan in the cooling water tower. Delta's temperature controller and AC motor drive are able to control the rotation speed of these devices and achieve energy-saving effect (See Figure 4).

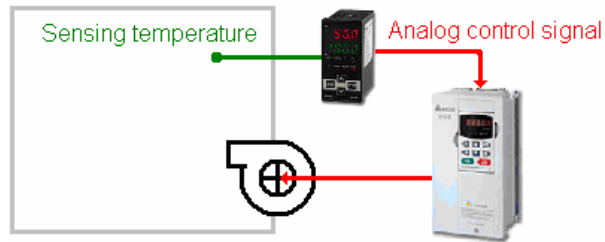


Figure 4

For the HVAC application, Delta offers AC motor drive, programmable logic controller, temperature controller, human machine interface and many communication modules to compose an automatic control line. Besides giving our clients more convenient and comfortable living environment, the proper motor control also reduces unnecessary waste of electricity.

More information on Delta's industrial automation product, visit our website:
<http://www.delta.com.tw/industrialautomation>