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## Development of PMSM drive for water supply system of building management

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In recent years, the PMSM is receiving more interest for water supply system. The efficiency of the PMSM is higher than the induction motor in wide operating range. In order to cope with change load, the variable speed control for the pump motor is needed. In case of applying the variable speed driving system, the efficiency can be increased by about 15~30%. And the PMSM has high power density. For those reasons, the PMSM is widely used in various industries, and was applied for water supply system in this paper. The position information is essential for the PMSM. However it is structurally difficult to place the position sensor in the fluid machinery and the cost of the system is increased in case of applying the position sensor. This paper deals primarily with development of the PMSM drive for water supply system using extended EMF sensor-less algorithm. The sensor-less control of the PMSM is achieved in a misaligned coordinate frame based on an estimated rotor position. Because the information of the rotor position is included in extended EMF, the extended EMF should be estimated through an extended EMF observer. The estimated rotor position from the estimated d and q axis extended EMF is used in the PMSM. And the heat sink design was optimized through CFD analysis for reduction of inverter size. Experimental results from a laboratory prototype are presented to validate the feasibility of the proposed using 11kW class PMSM for water supply system.

### Biography

Byong Jo Hyon received his BS and MS degrees in electrical engineering both from the Pohang University of Science and Technology, Pohang, Korea, in 2010 and 2012, respectively. He is currently with Korea Electronics Technology Institute, Bucheon, Korea. His research interests include permanent magnet synchronous machine control, sensorless algorithms, and DSP control.

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