

The dc-excited dual-memory machine utilizes two different kinds of permanent magnet (PM) materials for each PM pole. By employing a set of separately controlled magnetizing windings, it can easily realize the pole-changing function without affecting or changing the armature winding topology. In this paper, the principle of pole changing of the dc-excited dual-memory machine is analyzed by finite-element method. With the aim of preventing unexpected demagnetization of the low-coercivity PMs, a special scheme, namely the pole-protection scheme, is developed to shield these PMs. Experimental results are given to verify the pole-changing principle of the dc-excited dual-memory machine, and the feasibility of pole-dropping and pole-retrieving operations.