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P2.083 The starting mechanism analysis of ITER PF AC/DC in series converters

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The International Thermonuclear Experimental Reactor (ITER) Poloidal Field (PF) AC/DC in series converters are composed by three converter units in series to supply megawatt energy to PF coil. With the characteristic that high power, complex operating modes, large amount of snubber capacitors and stray inductances, any inappropriate starting mechanism could introduce over-voltage and then damage the converter. Therefore, it is imperative to give full consideration to the starting mechanism of the ITER PF AC/DC in series converters. The external bypass that located at the downstream of the dc reactors is designed to provide the protection of converter in fault conditions at very beginning, which also provide another alternatives to the starting mechanism of ITER PF AC/DC in series converters. In this paper, the starting mechanisms which assisted by the external bypass is proposed to activate the ITER PF AC/DC in series converters securely and reliably. The starting over-voltage of three starting mechanisms during full-voltage starting are simulated to propose the optimal starting mechanism. According to the simulation, the starting mechanism that start the two converter units firstly and then start the third one is selected as the optimal starting mechanism for ITER PF AC/DC in series converters. The feasibility of the proposed optimal starting mechanism is verified by the experiment on the ITER PF converter sequential control test facility.

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