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P3.097 THE CONCEPTUAL DESIGN OF FAST DISCHARGE RESISTOR SYSTEM FOR LARGE FUSION DEVICE

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When the quench occurrence in the operating course of the large fusion device, huge energy stored inside the magnetic load and the maximum current flow from the superconducting load can reach 100kA with maximum inductance value to be 2H that will lead an irreversible damage on the device. By dissipating the energy by means of the fast discharge resistor(FDR) system connected in series to the magnetic load, the current in the magnetic load will diverted from a short circuit into the FDR system.

The FDR system consists of the resistor modular matrix to form different resistance value with serial and parallel connection in the method of flexible coupling. Through the analysis and simulation course of the structure resist, deformation, heat, stray parameter and EMC effect, the structure adopts the zigzag design to connect the edges of resistor laminator with supporting bar using epoxy resin between each interval. The material of the resistor laminator takes the 304 stainless steel. The staddle of G10 material goes across the whole structure to resist the gravity effect. The design of the heat dissipation effect is to adopt forced air cooling from the bottom to the top with air exchange device.

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