Abstract—Recently, a growing number of DC systems exist, based on the development of electrical energy consumption. For low voltage DC grids, switching devices are needed which have to meet technically sophisticated requirements. These devices have to handle fault currents of several hundred amperes and system voltages up to thousand volts. A typical DC circuit breaker has to provide low on state losses, light weight and small volume. On the way toward fulfilling these requirements, hybrid circuit breaker can represent the optimal solution. Hybrid DC circuit breaker combines the advantages of mechanical contacts and semiconductors. In the current work such device has been designed and constructed using a commercial switch and electronic components in the laboratory. The breaking performance of this experimental prototype has been investigated, thus the interruption of nominal and failure currents in case of different time constants can be identified. The investigated hybrid switching device has been optimized in order to maximize the switching capacity and the protection of the semiconductors.

Keywords—hybrid DC circuit breaker; self-supplying; optimization; low voltage DC switchgear; high-voltage; direct current; HVDC;