Detection Method of DC High-resistance Earth Fault with High Current Arc on DC Traction System

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Detection of high-resistance earth faults on DC 1.5 kV traction power supply systems have been one of the unresolved problems for years. There are several methods to detect such faults using some additional wires and/or devices along the track; however, due to their costs and maintenance problems, fault detection method using electrical measurements only inside traction substations is desired. We analyzed a recorded current waveform of an actual fault to find out the characteristics. On the basis of the result, we propose a novel method for detecting high-resistance earth faults with discharging arc of more than a thousand amperes DC current.