Voltage Sag Reasons and Its Compensation in Distribution Systems

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Abstract:

By quick technological advancements in industrial control processes, major industries demand higher power quality. According to IEEE 1159-1995 Standard, any problems in voltage, current or frequency that lead to the error or malfunctions in electrical equipment are considered as a power quality problem. Among the power quality phenomena, voltage sag has been an important problem for power systems in meeting advanced industries. In this paper, following a general review on the voltage sag phenomenon, short circuit faults, starting big inductive motors and energization of the transformer are considered as the main factors of providing this event. Then voltage sag characteristics are presented. And then the suggested strategies to reduce this event are evaluated. Applying conventional methods for voltage sag compensation is not able to meet this event completely. In recent years, with rapidly developing in semi-conductor industries and control systems, using compensators which are based on controllable electronic devices with higher speed, has attracted many power experts' attentions. At the end, voltage sag compensation style has been studied through applying different compensators.

Keywords : power quality; voltage sag; short circuit fault; starting big inductive motors; energization of the transformer; FACTS devices dynamic voltage regulation; Distribution Synchronous static compensator

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