

## 电气化铁路接入电力系统的电压等级问题

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### 摘要

以高速电气化客运专线工程为背景, 从接触网电压降落、三相电压不平衡度和谐波等方面详细分析了采用三相变压器、V/v接线变压器和单相牵引变压器以带回流的直接供电方式和自耦变压器供电方式分别接入110 kV和220 kV电力系统时普速电气化铁路和高速电气化铁路对系统短路容量的要求和对其造成的影响, 讨论了普速电气化铁路和高速电气化铁路接入电力系统的电压等级问题。计算分析结果表明: 对于普速电气化铁路, 应优先考虑将其接入110 kV电力系统, 接入点的短路容量应大于牵引变压器额定容量的25倍; 对于高速电气化铁路, 应优先考虑将其接入220 kV电力系统, 接入点的短路容量应大于牵引变压器额定容量的35倍。

关键词 [电力系统; 电压等级; 电气化铁路; 三相不平衡; 谐波](#)

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## Research on Voltage Class of Power System to Be Connected with Electrified Railways

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### Abstract

Against the background of being constructed high-speed special electrified railway line project for passenger transportation, the requirement of common-speed and high-speed electrified railways to short-circuit capacity of power grid under the connection mode of direct feeding system with return wire via three-phase transformer, two single-phase transformers wired in V/v mode and single-phase traction transformer as well as under direct connection mode via autoformer feeding system, and the influence of electrified railway on short-circuit capacity are analyzed in detail in respects of voltage loss of contact line, unbalance degree of three-phase voltage, harmonics and so on. The voltage class of the power system to be connected with common-speed or high-speed electrified railways is researched. Results of calculation and analysis show that for common-speed electrified railway the priority should be given to 110kV power system and the short-circuit capacity of power system at the connection point should be more than 25 times of the rated capacity of traction transformer; for high-speed electrified railway the priority should be given to 220kV power system and the short-circuit capacity of power system at the connection point should be more than 35 times of the rated capacity of traction transformer.

Key words [power system; voltage class; electrified railway; three-phase unbalance; harmonics](#)

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