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Rehabilitation of the tram DC traction with modern power converters

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Abstract

This paper approaches problems of tram DC motors traction system modernization, system widely used in the area of Eastern Europe. First, the state-of-the-art and an overview of trams equiped with DC motors and classical rheostatic control system are presented. Poor economic status of this region only allows upgrading these trams with modern power converters. These improve the burning issues and allow reducing energy consumption and raising operational reliability. Second, the paper proposes the rehabilitation of the traction system with an new developped electronic module SDMC-103-04. In developping such a microcontroller based system is important to consider the characteristic problems in tram applications. Some of these problems relate to the friction between the wheel and rail (braking problems), or to the synchronization of the motors, when a multi-motor system is used. The developed module SDMC-103-04 has been tested on 71-605 tram type and confirmed the energy consumption reduction with about 30-40% and reliability increasing with about 20-25%.