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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 25122.3-2018

**Railway applications - Power converters installed on board
rolling stock - Part 3: Traction converters for locomotives**

轨道交通 机车车辆用电力变流器 第3部分：机车牵引变流器

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Foreword

GB/T 25122 "Power converter for rail transit vehicles" is divided into five parts.

--- Part 1. Characteristics and test methods;

--- Part 2. Supplementary technical information;

--- Part 3. Locomotive traction converters;

--- Part 4. Electric vehicle unit traction converter;

--- Part 5. Urban rail vehicle traction converter. This part is the third part of GB/T 25122. This part is drafted in accordance with the rules given in GB/T 1.1-2009. Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying these patents. This part is proposed by the National Railway Administration. This part is under the jurisdiction of the National Traction Electrical Equipment and Systems Standardization Technical Committee (SAC/TC278). This section is responsible for drafting the unit. CRRC Zhuzhou Electric Locomotive Research Institute Co., Ltd. Participated in the drafting of this section. CRRC Yongji Motor Co., Ltd., CZ Dalian Electric Traction R&D Center Co., Ltd., CZ Qishuyan Locomotive Co., Ltd. The main drafters of this section. Feng Jianghua, Zhang Yi. Participated in the drafting of this section. Liu Kean, Rao Pei Nan, Liu Ligang, Jiang Tao, Li Bin. Power converter for rail transit vehicles Part 3. Locomotive traction converter

1 Scope

China's national standard for the traction converters fitted to locomotives. It is Part 3 of GB/T 25122 and specifies the service conditions, the technical requirements, the type tests

and the routine tests for locomotive traction converters. A traction converter is what stands between the overhead line and the motors, and it is the component that made the modern locomotive possible. The supply is either alternating current at line frequency or direct current at a voltage that varies widely with load and distance from the substation; the motors are three-phase machines that need a variable voltage at a variable frequency to produce controlled torque from standstill to full speed. The converter performs that transformation with power semiconductors, and everything a driver commands passes through it. A locomotive is the most demanding of the three cases the series covers, and this part exists separately for that reason. It is a single vehicle developing several megawatts, so the converter is large, the currents are enormous, and the cooling is a system in itself. It hauls trains far heavier than itself, which means the traction effort is limited by adhesion and the converter must control torque precisely enough to work at the limit of wheel slip without exceeding it. And it operates on a line whose voltage may collapse under load or vary between electrification systems on a through route. So the requirements cover the electrical ratings and the supply variation the converter must tolerate, the output characteristics and control, the protection and its coordination, the insulation coordination and the dielectric tests, the cooling and the thermal behaviour, the electromagnetic compatibility with the signalling system, the shock and vibration of a locomotive underframe, and the type and routine test programme. Issued on 28 December 2018 and in force since 1 July 2019.

This part of GB/T 25122 specifies the use conditions, system composition, main parameters and technical requirements of traction converters for AC drive locomotives. Requirements, inspection methods, inspection rules, marking, packaging, transportation and storage. This section applies to AC drive locomotive traction converters (hereinafter referred to as converters), other similar uses of traction converters can refer to carried out.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 1402-2010 rail traffic traction power supply system voltage

GB/T 2423.1-2008 Environmental testing of electric and electronic products - Part 2. Test methods Test A. Low temperature

GB/T 2423.2-2008 Environmental testing of electrical and electronic products - Part 2. Test methods Test B. High temperature

GB/T 2423.17 Environmental testing of electric and electronic products - Part 2. Test method test Ka. salt spray

GB/T 2900.32 Electrotechnical terminology power semiconductor device

GB/T 2900.33 Electrotechnical terminology power electronics technology

GB/T 4208-2017 enclosure protection grade (IP code)

GB/T 21413.1-2008 Railway applications -- Electrical equipment for rolling stock -- Part 1 .
General conditions and general rules

GB/T 21414 Regulations for the protection of electrical hazards in railway applications

GB/T 21563-2018 Impact and vibration test of rail transit locomotive equipment

GB/T 24338.4-2018 Electromagnetic compatibility of rail transit - Part 3-2. Equipment for
rolling stock

GB/T 25119 rail transit rolling stock electronic device

GB/T 25122.1-2018 Power converters for railway rolling stock -- Part 1 . Characteristics and
test methods

3 Terms and definitions

GB/T 2900.32, GB/T 2900.33 and GB/T 25122.1-2018 and the following terms and
definitions apply to this file.