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

GB/T 12758-2023

Replacing GB/T 12758-2004

General specification of signal system for urban rail transit

城市轨道交通信号系统通用技术条件

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Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Abbreviated terms
5	General requirements
6	System requirements
6.1	System classification
6.2	System composition
6.3	Block method
6.3.1	General
6.3.2	Technical requirements
6.4	System technical level...
6.5	Driving mode...
6.6	Signal display...
7	Sub-system requirements...
7.1	Train supervision and control...
7.2	Automatic train protection...
7.3	Automatic train operation...
7.4	Interlocking...
7.5	Data communication...
7.6	Maintenance and monitoring...
8	Train depot signal system...
9	Human-machine interface...
10	Power requirements...
11	Interface...
12	Reliability, availability, maintainability, and safety (RAMS) requirements...
12.1	Reliability...
12.2	Availability...
12.3	Maintainability...
12.4	Safety...
13	System performance...
13.1	System capabilities...

13.2 RAMS performance indicators...

14 Electromagnetic compatibility and protection...

14.1 Electromagnetic compatibility...

14.2 Protection...

1 Scope

GB/T 12758-2023 is the Chinese national standard on general specification of signal system for urban rail transit, in the field of railway engineering. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 7 September 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 January 2024. Classification: ICS 45.020, CCS Q84. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document specifies the general requirements, system and subsystem requirements, train depot signal system, human-machine interface, power supply, interfaces, RAMS, system performance, electromagnetic compatibility and protection requirements, and applicable environmental conditions for urban rail transit signal systems. This document applies to urban rail transit systems including subways, light rail, monorails, medium- and low-speed maglev, urban rapid transit, and automated guideway transit systems.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 10493, Technical specification for crossing signal equipment within the station

GB 10494, Technical specification for crossing signal equipment in wayside

GB/T 16251, Ergonomics principles in the design of work systems

GB/T 21562, Railway applications - Specification and demonstration of Reliability, Availability Maintainability and Safety (RAMS)

GB/T 22239, Information security technology - Baseline for classified protection of

cybersecurity

GB/T 24338.4, Railway applications - Electromagnetic compatibility - Part 3-2. Rolling stock - Apparatus

GB/T 24338.5, Railway applications - Electromagnetic compatibility - Part 4. Emission and immunity of the signalling and telecommunications apparatus

GB/T 25119, Railway applications - Electronic equipment used on rolling stock

GB/T 28808, Railway applications - Communication, signaling and processing systems - Software for railway control and protection systems

GB/T 28809, Railway applications - Communication, signaling and processing systems - Safety related electronic systems for signaling

GB/T 32347.3, Railway applications - Environmental conditions for equipment - Part

3 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in GB/T 50833, apply.

3.1 urban rail transit signal The collective name for the technologies and measures applied to urban rail transit systems, which are used to manually or automatically achieve train dispatching, train operation control, safety interval control and management.

3.2 centralized traffic control A system that centrally displays, within the dispatching center, the status of stations, sections, signals, turnouts, and track sections within a given area, as well as train positions, and enables the dispatcher to centrally control signals and points within the area and direct train operations.

3.3 automatic train supervision A collective name for the technologies of automatically realizing train supervision and control, train operation monitoring and management.

3.4 automatic train protection The maximum number of train pairs that can continuously complete turn-back operations at the same turn-back station per hour.

4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply. AM. Automatic Train Operating Mode ATO. Automatic Train Operation ATP. Automatic Train Protection ATS. Automatic Train Supervision CAM. Creep Automatic Mode CI. Computer Interlocking CM. Coded Train Operating Mode CTC. Centralized Traffic Control EUM. Emergency Unrestricted Train Operating Mode FAM. Fully Automatic Train Operation Mode FAO. Fully Automatic Operation GOA. Grade Of Automation MTBF. Mean Time Between Failure MTTR. Mean Time To Repair PIS. Passenger Information System RAMS. Reliability,

Availability, Maintainability and Safety RM. Restricted Train Operating Mode RRM. Remote Restricted Train Operating Mode SIL. Safety Integrity Level TFFR. Tolerable Functional Failure Rate UPS. Uninterruptible Power System

5 General requirements

5.1 The urban rail transit signal system (hereinafter referred to as the signal system) shall be safe, reliable, economical and reasonable, and the equipment of each subsystem shall be able to work together to achieve the overall goal of train operational controls. It shall have the functions of protecting train safety, improving operational efficiency, and enhancing the level of automatic train operation.

5.2 The signal system shall be of high reliability and high availability. Systems, equipment, and circuits related to driving safety shall comply with the fail-safe principle.

5.3 The signal system shall be adaptable to the application of new technologies, enabling interoperability and collaborative operation of equipment from different systems or subsystems.

5.4 The signal system shall determine the composition and scale of the system according to operational needs and shall meet the needs of line extension and expansion.

5.5 The signal system shall meet the operational needs of urban rail transit with different passenger volumes and train densities.

5.6 Urban rail transit systems with fully enclosed lines shall be equipped with ATP systems; urban rail transit systems with partially enclosed lines shall adopt corresponding technical measures to ensure train operation safety based on operating conditions such as running interval, train speed, and line closure status.

5.7 Non-enclosed lines with level crossings shall be provided with level crossing protection functions. The signal system may be provided with crossing signal equipment independently; crossing protection equipment may be jointly implemented with the road traffic signal control system. Independently installed level crossing signal equipment shall comply with the provisions of GB 10493 and GB 10494. When lever crossing protection equipment is installed together with the municipal road traffic signal control system, safety measures consistent with those of the municipal road traffic should be adopted. If an ATP subsystem is configured, the level crossing protection equipment should be linked with the ATP subsystem.

5.8 The train supervision and control center (hereinafter referred to as the control center) shall realize unified command and dispatch of trains operating on the line, realize unified command and dispatch of train operation in the network, and realize coordinated command of lines between rail transit networks.

5.9 Urban rail transit lines shall be able to operate independently. For lines requiring