

ICS 43.040.40

CCS T24



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

GB/T 44287-2024

**Performance requirements and test methods for electronic
braking systems (EBS) of commercial vehicles**

商用车电控气压制动系统（EBS）性能要求及试验方法

Issued on: August 23, 2024

Implemented on: March 1, 2025

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 General requirements
- 5 Performance requirements
 - 5.2 Response time
- 6 Test conditions
 - 6.2 Road conditions
 - 6.3 Vehicle status
- 7 Test methods
 - 7.1 Braking performance

1 Scope

GB/T 44287-2024 sets the performance requirements and test methods for the electronically controlled pneumatic braking systems of commercial vehicles. EBS is what turned the air brake from a pneumatic system with an electronic anti-lock function into an electronically controlled one with a pneumatic backup, and it is the platform every heavy vehicle safety function is built on: the shorter and more consistent stopping distance, the brake force distribution between axles and between tractor and trailer, the brake lining wear equalisation, and the interface that adaptive cruise control and emergency braking act through. The standard sets the functional and performance requirements, the response and build-up times, the braking performance in the laden and unladen conditions, the compatibility between tractor and trailer, the requirements on the backup circuit and on the behaviour under electrical and pneumatic failure, the warning and diagnostic requirements, and the electromagnetic compatibility, together with the bench and vehicle test methods and the pass criteria. For a truck or trailer maker, a braking supplier or a testing house in China, this is the qualification text.

This document specifies the general requirements, performance requirements, test conditions and test methods for electronic braking system of commercial vehicles. This document applies to category M2, M3, N2 and N3 vehicles that are equipped with electronic braking system and comply with the provisions of GB/T 15089.

2 Normative references

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

GB/T 5620 Road vehicles - Vocabulary and definition for braking of automotive vehicles and their trailers

GB 12676-2014 Technical requirements and testing methods for commercial vehicle and trailer braking systems

GB/T 13594-2003 Antilock braking performance and test procedure for motor vehicles and their trailers

GB/T 15089 Classification of power-driven vehicles and trailers

ISO 11992-2:2023 Road vehicles - Interchange of digital information on electrical connections between towing and towed vehicles - Part 2: Application layer for brakes and running gear

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in GB/T 5620 and GB 12676-2014 and the following apply.

3.1 electronic braking system; EBS A pneumatic braking system that generates and transmits control signals in the form of electrical signals and controls the generation of braking force by outputting electrical signals.

3.2 electronic control function A function of the electronic control unit (ECU) receiving the electronic control signal output by the driver through the brake pedal to operate the electronic control brake master valve or the external braking request issued by other modules through the bus, and then sending an electronic control command to brake the vehicle. NOTE 1: The electronic control brake master valve refers to a device that converts the brake pedal position into an electronic control signal and an air pressure control signal. NOTE 2: The electronic control unit refers to a component used to process the information provided by the sensor and issue control commands.

3.3 deceleration control A function of determining the braking deceleration of the vehicle according to the brake pedal position.

3.4 brake assist; BA The function of the electronic braking system automatically providing a greater braking effect than that corresponding to the pedal position or trigger the full cycle of the anti-lock braking system according to the driver's emergency braking needs.

4 General requirements

4.1 Vehicles equipped with an electronic braking system shall have at least electronic

control functions such as service braking, anti-lock braking, deceleration control and brake assist. When the electronic control function fails, the service braking system shall have a backup brake control function, which can achieve emergency braking by controlling and providing braking force through air pressure.

4.2 The electronic braking system shall have a self-checking function.

4.3 The vehicle shall be equipped with an EBS fault signal device complying with the requirements of 4.4, which shall be able to alarm the driver when any fault occurs in the system that affects the EBS control, response signal generation or transmission.

5 Performance requirements

5.1 Braking performance Under normal working conditions of EBS, the service braking performance requirements specified in

5.2.1 of GB 12676-2014 and the anti-lock braking performance requirements specified in Clause 5 of GB/T 13594-2003 shall be met. When the electronic control function fails, the backup brake control function shall meet the emergency braking performance requirements specified in

5.2.2 of GB 12676-2014.

5.2 Response time

5.2.1 For vehicles equipped with an electronic braking system, in the electronic control mode, when the actuation time is

0.2 s, the time from the start of actuation of the brake system control device to the time when the pressure in the brake chamber reaches 75 % of the steady-state maximum pressure value shall not exceed

0.5 s.

5.2.2 For vehicles with trailer control function, the following requirements shall be met in the electronic control mode:

a) According to the method of B.2.5 in GB 12676-2014, the time from the actuation of the brake pedal to the time when the pressure measured at the air pressure control pipe joint reaches 75 % of the target value shall not exceed

0.4 s;

b) According to ISO 11992-2:2023, the time from the actuation of the brake pedal to the time when the digital command value of the electronic control circuit reaches 75 % of the target value shall not exceed

0.3 s.

5.3 Deceleration control When the electronic braking system adopts the electronic control mode, under the premise that the brake assist function is not activated, the deviation between the average no-load deceleration and the average full-load deceleration corresponding to the same pedal position shall not exceed 20 %.

5.4 Brake assist When the electronic braking system identifies an emergency braking condition, at least one wheel triggers the anti-lock braking system (ABS) full cycle or the braking efficiency is not less than 90 % of the mean fully developed deceleration (MFDD) of the full-load engine disengagement type 0 test specified in

5.1.4 of GB 12676-2014.

6 Test conditions

6.1 Environmental conditions During the test, the wind speed shall be less than 5 m/s and the ambient temperature shall not be higher than 35 °C.

6.2 Road conditions

6.2.1 The test road shall be dry, flat and solid.

6.2.2 The slope of the test road surface on any 50 m length in the longitudinal direction shall be less than 1%.

6.2.3 Unless otherwise specified, the test road surface shall have good adhesion.

6.3 Vehicle status

6.3.1 The vehicle shall be run-in according to the run-in procedure specified by the manufacturer or the requirements of

5.1.1.2 of GB 12676-2014.

6.3.2 The mass status of the test vehicle shall comply with the empty and full load distribution specified by the manufacturer and shall be stated in the test report.

6.3.3 At the beginning of the test, the tires shall be cold and at the specified pressure status corresponding to the actual wheel load when the vehicle is stationary.

6.3.4 During the test, auxiliary braking systems such as retarding braking system and type A electric regenerative braking system shall be turned off; for type B electric regenerative braking system, the battery charge status shall ensure that the braking force provided by the electric regenerative braking system does not exceed the minimum value guaranteed by the system design.

7.1 Braking performance

7.1.1 In the electronic control mode, perform the service braking test in accordance with the