



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

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**Intelligent transportation systems - Extended-range backing aid
systems - Performance requirements and test procedures**

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Table of Contents

Foreword	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols	8
5 Functional and performance requirements	8
6 Test requirements	16
Appendix A (Informative) Detection method of system delay time	25
Appendix B (Informative) Test example of extended-range backing aid system.....	27
References	32

1 Scope

This standard specifies the function and performance requirements, as well as the test requirements, of the extended-range backing aid system.

This standard applies to light vehicles, mainly including passenger cars, small passenger cars and ordinary trucks in commercial vehicles, excluding motorcycles. Refer to the classification of vehicles in GB/T 3730.1.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 21436-2008 Parking distance monitoring & warning device for motor vehicle

ISO 15006 Road vehicles - Ergonomic aspects of transport information and control systems
- Specifications for in-vehicle auditory presentation

ISO 15008 Road vehicles - Ergonomic aspects of transport information and control systems
- Specifications and test procedures for in-vehicle visual presentation

ISO 16750 Road vehicles - Environmental conditions and testing for electrical and electronic equipment

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 b) Automatic execution;

c) A warning signal is generated when the fault is diagnosed.

5.1.4 Driver interface and information strategy

5.1.4.1 Information prompt method Audible method is the information prompt method that the system shall have;

other methods, such as visual method, can be used as a supplement.

5.1.4.2 Audible information The system's audible information prompt shall meet the following conditions:

a) The audible information prompt shall meet the requirements of ISO 15006.

b) The audible information prompt shall also meet the basic requirements as follows:

1) The distance indication warning can be expressed, either audibly or visually.

Corresponding to the distance, the distance indication warning must be coded into at least two segments; each segment is expressed as a different repetition frequency. The basic criterion is that the high repetition frequency or continuous corresponds to a relatively short distance. Synthetic or recorded voices can also be used as audible reminders. The system shall keep warning, when the obstacle is continuously detected; stop warning, when the obstacle is no longer detected. The audible information can be paused, after a period of time, but the system shall remain active. As long as the distance between the vehicle and the obstacle decreases, the audible information shall automatically start again. If the distance to the obstacle increases, the audible signal will remain in the off state.

2) Presence warnings can be expressed audibly, visually, or a combination of both. They shall be coded in a certain way, to make it clearly inform the driver, that there are obstacles in the zone of regard. The presence warning can be combined with the distance indication warning; the synthesized or pre-recorded voice can also be used. The system shall keep warning, when the obstacle is continuously detected; stop warning, when the obstacle is not detected. The audible information lasts for at least 1s; it can be paused, BUT the system shall remain active. As long as the distance between the vehicle and the obstacle decreases, the audible signal shall automatically start again. If the distance to the obstacle increases, the audible signal will remain in the off state.

3) Dynamic warnings shall be presented, either by auditory means or supplemented with visual means. The dynamic warning shall be coded in a certain way, so that the driver immediately notices the warning.

Dynamic warning shall be distinguished from distance indication warning and presence warning. Meanwhile, it shall prompt the driver to take immediate action. It may use synthesized or pre-recorded speech, as a dynamic warning.

4) The system's enable/disable status prompts and fault/interference prompts can be expressed, either in audible or visual means; however, they shall be clearly distinguished from other signals. It may use synthesized or pre-recorded speech, as a warning method. The status prompt can be paused, after a period of time, BUT it shall remain active.

5) The driver can be allowed to manually suppress the audible warning temporarily. The audible warning shall be in the inhibited state, until the driver changes its state to start. When the system is activated next time, the audible warning shall be automatically restored.

6) This standard does not specify the state switching, between the audible alarm types (distance indication warning, presence warning, dynamic warning). The general principle of state switching is to keep the audible state smooth and intuitive. It shall reduce the frequent switching, between alarm types; this is especially important for dynamic warnings.

7) If the system does not issue a presence warning, within 5 m of the entire zone of regard, OR the warning duration is less than 3 s, it shall provide a special diagnostic mode. When in the diagnostic mode, the system shall issue a presence warning, within 5 m of the entire zone of regard.

The warning response time shall last, at least 3 seconds, without interruption. The diagnostic mode is only used, by technical service personnel, for standard compliance testing. This standard does not restrict how to enter or exit the diagnostic mode.

5.1.4.3 Visual information The system's visual information prompt shall meet the requirements as follows:

a) The visual information prompt shall meet the requirements of ISO 15008.

b) The visual information prompt shall also meet the basic requirements as follows:

1) The visual information is coded into at least two levels AND expressed in different colors. For example, red or amber means collision is imminent; yellow means attention. If different or more warning levels are used, they shall not conflict with the above basic guidelines.

2) Auditory-based readiness for service indication system: If the system's readiness for service indication is based on auditory perception, its activation delay refers to the time, FROM the end of the signal of the readiness for service indication, TO the moment when the system detects an obstacle and issues a warning. The obstacle is placed in a specified location, behind the vehicle, in advance. The average start delay shall not exceed 500 ms. There can be a period of silence, BETWEEN the readiness for service tone AND the system warning tone, in order to distinguish; however, the activation delay shall meet the

above requirements.

3) Visual and auditory-based readiness for service indication system: If the system's readiness for service indication is based on both sight and hearing, the activation delay requirements are the same as the above-mentioned audible activation delay requirements.

4) Other readiness for service indication system: If the navigation display screen and other vehicle display systems are used, to display the information of the extended-range backing aid system, if the information of this system appears on the display screen, it is regarded as the readiness of system service.

5.2.3.2 Warning delay When the system is active, the warning delay is the time period, FROM the appearance of an obstacle in the zone of regard, TO the system prompting or warning. The average warning delay shall not exceed 150 ms. The maximum value shall not exceed 250 ms.

The detection delay is verified by the corresponding test procedures. The measurement accuracy of the test is at least not less than 1/10 of the delay time. The final result is the arithmetic average of more than 10 measurements.

5.2.4 Requirements of presence warning

5.2.4.1 Horizontal zone of regard The horizontal zone of regard is the projection of the zone of regard on the pavement (as shown in Figure 1). This zone consists of the following areas:

a) Bnear: It is laterally centered on the longitudinal centerline of the vehicle, covering 80% of the width of the bumper; it is longitudinally extended from

1 m behind the bumper, to at least 4 m behind the bumper.

b) Bfar: The lateral range is the same as Bnear; it is longitudinally extended from Bnear to at least 5 m behind the bumper.

waves or electromagnetic waves), which is caused by their reflections.

6.3 Detection of system's delay time

6.3.1 For the detection of the system's delay time (see Table 1), the detection method and test equipment shall be able to measure the system's delay time, at an accuracy of 0.01 s.

6.3.2 Before performing this test, after the ignition voltage is turned on, the vehicle's electrical system and electronic control unit shall be given no less than

1.5 s of preparation time. Refer to Appendix A, for the detection method of system's delay time.

6.4 Test requirements of presence warnings

6.4.1 Basic requirements For determining whether the system under test meets the functional requirements of this standard, the following general requirements shall be met.