# GB

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# GB/T 35548-2017

# Magnetic vehicle detector

地磁车辆检测器

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**Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the PRC;**

**Standardization Administration of the PRC.**

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# Magnetic vehicle detector

## 1 Scope

This Standard specifies the composition, technical requirements, test methods, inspection rules, marking, packaging, transportation, and storage of magnetic vehicle detector.

This Standard applies to magnetic vehicle detectors used in road traffic management systems.

## 2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 2423.1 Environmental testing for electric and electronic products - Part 2: Test methods - Tests A: Cold

GB/T 2423.2 Environmental testing for electric and electronic products - Part 2: Test methods - Tests B: Dry heat

GB/T 2423.3 Environmental testing - Part 2: Testing method - Test Cab: Damp heat, steady state

GB/T 2689.2 Life test and acceleration life test charts - Evaluation of their Weibull distributions

GB/T 4208 Degrees of protection provided by enclosure (IP code)

GB/T 9254 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

GB/T 17626.2 Electromagnetic compatibility - Testing and measurement techniques - Electrostatic discharge immunity test

GB/T 17626.3 Electromagnetic compatibility - Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

GB/T 17626.4 Electromagnetic compatibility - Testing and measurement techniques - Electrical fast transient/burst immunity test

# 6 Technical requirements

## 6.1 Appearance

There shall be no deformation or cracks, etc. on the enclosure of the detector. The coating shall be even and uniform in color and shall not have defects such as foaming and cracking. The nameplate, mark, text, symbols, etc. on the enclosure shall be clear, firm, upright, and not easy to fall off.

## 6.2 Dimensions

The height of the vertical structure of the detector shall be no more than 100 mm. The horizontal plane shall be a regular shape. The maximum external width shall be no more than 110 mm.

## 6.3 Functional requirements

### 6.3.1 Function of traffic information collection

It shall collect the magnetic detection data. Traffic detection of vehicle volume, instant speed, etc. can be achieved by a single or multiple-detectors combination.

### 6.3.2 Communication function

It shall support for configuration to join a wired or wireless communication network.

### 6.3.3 Function of remote firmware upgrade

It shall support system remote firmware upgrades.

### 6.3.4 Automatic reset function

It shall have an automatic recovery function. When a fault is detected, it shall automatically reset the equipment.

## 6.4 Performance requirements

### 6.4.1 Wireless transmission

#### 6.4.1.1 Working frequency band

The working frequency band for detector wireless transmission should adopt 433 MHz, 470 MHz, 2.4 GHz. The working frequency band for wireless transmission is shown in Table 1.

The detector is tested at a temperature of 40 °C and a relative humidity of 95% for 48 h. The product shall run normally and be logically correct.

#### 6.5.4 Pressure resistance

In use, the pressure of the external to the upper cover which can be borne by the detector shall not be less than 70 kN.

#### 6.5.5 Impact resistance

After 3 times of half sinusoidal pulse impact test with peak acceleration of 300 $m/s^2$ and pulse duration of 11 ms are carried out in the front and back, left and right, and up and down directions respectively, the product's functions shall be normal; the structure is not affected; the parts are not loose.

#### 6.5.6 Waterproof and dustproof

The degree of protection of the detector shall be in accordance with IP67 of GB/T 4208.

#### 6.5.7 Electromagnetic compatibility

The electromagnetic compatibility of the detector shall comply with the relevant requirements of Class A ITE of GB/T 17626.2, GB/T 17626.3, GB/T 17626.4, GB/T 17626.8, and GB/T 9254.

## 7 Test methods

### 7.1 Test conditions

**7.1.1** If no special cases are indicated, all tests are carried out under the following conditions:

a) Ambient temperature: 15 °C~35 °C;

b) Relative humidity: 25%~75%;

c) Atmospheric pressure: 86 kPa~106 kPa.

**7.1.2** During the test, the detector shall be installed in the middle of the lane to which it belongs; the top is flush with the road surface.

### 7.2 Treatment of test results

Except for special regulations, in general, for repeatable objective test items, it shall perform 3 tests and take the arithmetic mean as the test result. The test results are divided into two levels: pass and fail.

#### 7.6.1.1 Sending power

The testing instruments and equipment include a signal source, a coaxial line, and a spectrum analyzer.

The test steps are as follows:

a) USE a coaxial line to connect the signal source and spectrum analyzer;

b) Operate the signal source to send a signal of certain power; check the signal power received on the spectrum analyzer; calculate the line loss;

c) The detector is operated in the sending mode. Its indicators such as transmitting power, transmission rate, channel bandwidth all meet the test requirements;

d) USE the coaxial line to connect the module and spectrum analyzer;

e) SET the frequency of the spectrum analyzer to be consistent with the frequency of the RF signal; set the appropriate sweeping span, which is generally 5 times~10 times the channel bandwidth;

f) READ the maximum sending power.

#### 7.6.1.2 Receiving sensitivity

The testing instruments and equipment include a signal source, a coaxial line, and a spectrum analyzer.

The test steps are as follows:

a) USE a coaxial line to connect the signal source and spectrum analyzer;

b) Operate the signal source to send a signal of certain power; check the signal power received on the spectrum analyzer; calculate the line loss;

c) The detector is operated in the receiving mode. Its indicators such as modulation mode, transmitting rate, channel bandwidth all meet the test requirements;

d) The signal source sends a RF modulated signal. The detector receives the signal;

e) Adjust the signal source's transmission power with a certain step. COUNT the correct reception rate under each power. USE the 1% frame loss rate as a sensitivity measurement standard.

### 7.6.2 Wired transmission

p - Relative error of vehicle volume;

n - The measured value of the detector during the statistical period;

$n_0$ - The measured value of the counter during the statistical period.

**7.6.3.3 Working time**

According to the provisions of GB/T 2689.2, conduct an acceleration life test.

**7.7 Environmental adaptability tests**

**7.7.1 Test method for cold resistance**

It shall be in accordance with the provisions of GB/T 2423.1.

**7.7.2 Test method for dry heat resistance**

It shall be in accordance with the provisions of GB/T 2423.2.

**7.7.3 Test method for damp heat resistance**

It shall be in accordance with the provisions of GB/T 2423.3.

**7.7.4 Test method for pressure resistance**

Install the detector on the test bench of pressure tester; TURN on the pressure tester; gradually increase the pressure on the detector to 70 kN. The sample is not deformed or destroyed and is used normally.

**7.7.5 Test method for impact resistance**

The test steps are as follows:

a) Install the detector, according to the working position, on the impact test bench.

b) In the front and back, left and right, and up and down directions, a half sinusoidal pulse impact test with a peak acceleration of 300 m/s2 and a pulse duration of 11 ms is performed three times respectively.

c) After the test, there shall be no permanent structural deformation and electrical fault; the parts shall be free from damage; the fastening parts shall be free from looseness; the connectors shall not fall off or contact poorly.

d) After the test, it shall be able to work normally.

requirements or contract specifies, etc.

### 8.2 Lot grouping and sampling

#### 8.2.1 Lot grouping

Detectors of the same specification produced by raw materials of the same lot number and by the same process may be grouped into one lot.

#### 8.2.2 Sampling

SAMPLE according to JT/T 495.

### 8.3 Judgment rules

#### 8.3.1 Type inspection

In the type inspection, when the waterproof and dustproof and electromagnetic compatibility are unqualified, this type inspection is unqualified. If other items fail, double quantities of the sample shall be taken from the same lot of products, for inspection of the unqualified items. If still unqualified, this type inspection is unqualified.

#### 8.3.2 Exit-factory inspection

In the exit-factory inspection, if all the samples are qualified, the entire inspection lot is qualified. If 1 item fails, the item of this lot of products is inspected; the rejected unqualified products are allowed to be repaired and re-inspected after repair. If still unqualified, it is judged that this inspection is unqualified.

## 9 Marking, packaging, transportation, and storage

### 9.1 Marking

The trademark, name, model, and product number shall be indicated on the mark.

### 9.2 Packaging

**9.2.1** The outer packaging carton shall be moisture-proof, dust-proof, shock-proof, pressure-resistant, deformation-resistant, internal foam-supported to meet seismic requirements. The shielding film shall be used for inner packaging.

**9.2.2** In a single packaging case, there shall be a packing list, instructions for use, product inspection certificate, etc. The outer packaging carton shall be

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