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Motor Vehicle Speed Detector

机动车测速仪

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Table of Contents

Motor Vehicle Speed Detector

1 Scope

This Standard specifies the classification, technical requirements, test methods, inspection rules, verification requirements, and the technical requirements for marking, labeling and packaging of motor vehicle speed detector.

This Standard is applicable to devices for the speed measurement of motor vehicles on the road.

2 Normative References

The following documents are indispensable to the application of this document. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is 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: Test Method - Test Cab: Damp Heat, Steady State*

GB/T 2423.5 *Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test Ea and Guidance: Shock*

GB/T 2423.10 *Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test Fc: Vibration (sinusoidal)*

GB/T 2423.17 *Environmental Testing for Electric and Electronic Products - Part 2: Test Methods - Test Ka: Salt Mist*

GB/T 4208 *Degrees of Protection Provided by Enclosure (IP code)*

GB 7247.1-2012 *Safety of Laser Products - Part 1: Equipment Classification and Requirements*

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*

GB/T 17626.5 *Electromagnetic Compatibility - Testing and Measurement Techniques - Surge Immunity Test*

GB/T 17626.11 *Electromagnetic Compatibility - Testing and Measurement Techniques - Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests*

GB/T 19056 *Vehicle Travelling Data Recorder*

GB/T 21437.2 *Radio Vehicles - Electrical Disturbances from Conduction and Coupling - Part 2: Electrical Transient Conduction along Supply Lines Only*

GA/T 16 (all parts) *Code for Management Information of Road Traffic*

GA 36 *License Plate of Motor Vehicle of the People's Republic of China*

GA/T 497 *General Technical Specifications for Intelligent Monitoring and Recording System for Vehicles on Roads*

GA/T 543 (all parts) *The Data Elements for Public Security*

GA/T 832 *Technical Specifications for Image Forensics of Road Traffic Offences*

GA/T 833 *Technical Specifications for Automatic Recognition Technology of Motor Vehicle License Plate Images*

GA/T 1043 *Specifications for Operation and Maintenance of Road Traffic Monitoring and Controlling Equipment*

GA/T 1202 *General Technical Specifications for Fill Light Devices of Traffic Monitoring Cameras*

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Motor Vehicle Speed Detector

Motor vehicle speed detector is a device for the speed measurement of a motor vehicle running on the road.

3.2 Radar Speed Detection

Radar speed detection is a method of calculating the running speed of a motor vehicle

Speed detection in moving mode is a method of measuring the running speed of a motor vehicle when the vehicle is in moving mode and the speed detector is installed on the vehicle being tested.

3.11 Speed Detection Angle

Speed detection angle is the angle between the speed detection unit of the speed detector and the running direction of the motor vehicle being tested.

3.12 Detection Area

Detection area refers to the area where the speed detector can effectively measure the running speed of the motor vehicle and collect images of the corresponding motor vehicle.

3.13 Speed Detection Range

Speed detection range refers to the range, within which, the speed detector can effectively measure the running speed of a motor vehicle.

3.14 Effective Area of Taking Pictures

Effective area of taking pictures refers to the area where the speed detector can clearly capture images of a motor vehicle.

3.15 Overspeed Vehicle Capture Ratio

Overspeed vehicle capture ratio refers to the percentage of the number of effectively recorded overspeed vehicles to the number of effectively passing overspeed vehicles.

NOTE 1: the number of effectively recorded overspeed vehicles refers to the number of vehicles that contain effective vehicle information (license plate number, license plate color and vehicle type, etc.) and corresponding running speed in the record.

NOTE 2: the number of effectively passing overspeed vehicles refers to the number of vehicles that exceed the speed limit in the actual driving and have an intact license plate (the hanging of the license plate is standardized; there are no obstructions or defects).

3.16 Effective Ratio of Overspeed Vehicle Images

Effective ratio of overspeed vehicle images refers to the percentage of the number of effectively recorded images of overspeed vehicles to the total number of recorded images.

NOTE 1: among the number of effectively recorded images of speeding vehicles, the number of valid recorded images of the same speeding vehicle is no more than 3.

± 10%) • Θ_{nom}.

NOTE: Θ_{nom} is the nominal value of main lobe width of transmitting antenna of the multi-target radar speed detector, expressed in (°).

5.3.2.2.2 Sidelobe level

The sidelobe level of the multi-target radar speed detection unit shall be less than -15 dB.

5.3.2.2.3 Average value of microwave emission frequency

The average value of microwave emission frequency of the multi-target speed detection unit shall comply with (1 ± 0.2%) • f_0.

NOTE: f_0 is the nominal value of microwave emission frequency of the multi-target radar speed detector, expressed in (MHz).

5.3.3 Laser speed detection unit

5.3.3.1 Pulse repetition rate

The pulse repetition rate of the laser speed detection unit shall be not greater than 0.1%.

5.3.3.2 Eye safety

The laser speed detection unit shall comply with the Class-1 safety requirements for human eyes in GB 7247.1-2012.

5.3.4 Loop speed detection unit

5.3.4.1 Self-check function

The loop speed detection unit shall be able to automatically detect damages, such as: open-circuit and short-circuit of loops, etc.

5.3.4.2 Logic recognition of circuit

When a vehicle crosses two adjacent lanes and simultaneously acts on the loops of the two lanes, the logic processing of the loop speed detection unit shall be normal; the output parameters shall be correct.

5.3.5 Video analysis speed detection unit

5.3.5.1 Video frame rate

The video frame rate of the video analysis speed detection unit shall be not less than 25 frames/s.

5.5.3 Overspeed ratio capture ratio

The overspeed vehicle capture ratio shall be not less than 90%.

5.5.4 Effective ratio of overspeed vehicle images

The effective ratio of overspeed vehicle images shall be not less than 90%.

5.5.5 Corresponding of speed and picture

Under the indicated conditions of use, the motor vehicle reflected in the images collected by the single-target speed detector shall be the same vehicle as the motor vehicle being tested. The multi-target speed detector shall mark the running speed of the motor vehicle on the corresponding target being tested in the speed detection area in the images.

5.5.6 Requirements for image recording

Image recording shall comply with the requirements of GA/T 832.

5.5.7 Speed limit by divided time period

It shall be able to set different speed limit values in accordance with different time periods.

5.5.8 Speed limit by divided vehicle type

It shall be able to set speed limit values in accordance with vehicle type. The recognition of the vehicle type shall comply with the requirements of GA/T 833.

5.5.9 Speed limit by divided lane

It shall be able to set different speed limit values in accordance with different lanes, except for fixed, portable and vehicle-mounted single-target speed detectors installed on the roadside.

5.5.10 Variable speed limit

5.5.10.1 Reception of variable speed limit instructions

It shall have the function of receiving and executing the instructions of modifying speed limit value sent by the application software. The format of the instructions is shown in Appendix A.

5.5.10.2 Requirements for forensics

5.5.10.2.1 Delayed forensics

After the speed limit is modified, the speed detector shall carry out delayed forensics.

It shall be able to set the alarm speed value. When it is determined that the speed of a motor vehicle exceeds the alarm speed value, it shall be able to generate alarm information and support on-site alarm and remote alarm.

5.8.3 Running status monitoring

It shall be able to implement real-time monitoring of the running status of the equipment and automatically report the running status information. The running status information is shown in Appendix C. When the equipment is abnormally running, it shall be able to generate alarm information. The system should support online upgrade of firmware, and the speed detection function of the system shall not be affected after the upgrade.

5.8.4 Automatic correction

It shall be able to automatically monitor and correct the position changes of the speed detection unit.

5.8.5 Abnormal speed value filtering

It shall be able to automatically filter out abnormal speed values.

5.9 Electrical Performance

5.9.1 Requirements for power supply suitable

Under the power conditions of AC 220 V ± 44 V, 50 Hz ± 2 Hz or DC 10.8 V ~ 16.0 V (when the rated voltage is DC 12 V), DC 21.6 V ~ 32.0 V (when the rated voltage is DC 24 V), the speed detector shall be able to abnormally work.

5.9.2 Insulation performance

For speed detectors using AC 220 V, 50 Hz power supply, apply a 500 V of DC test voltage, the insulation resistance between the power electrode or other conductive circuits connected to the power electrode, and accessible parts (excluding lightning protection devices), such as: cabinets and installation cases, shall be not less than 10 MΩ. After the constant damp heat test, the insulation resistance shall be not less than 5 MΩ.

5.9.3 Pressure resistance

For speed detectors using AC 220 V, 50 Hz power supply, the speed detector shall not be broken down during the 1,500 V, 50 Hz withstand voltage test. After the test, the speed detector shall manifest no electrical failures and shall function normally.

5.9.4 Contact resistance

For speed detectors using AC 220V, 50 Hz power supply, the contact resistance between the grounding terminal and the accessible metal surface or metal parts shall

comply with the Class-B requirements in GB/T 17626.3. In other words, its basic functions are allowed to be temporarily reduced or lost, but after the test, it shall be able to return to normal on its own; the data stored in the speed detector shall not be lost.

5.10.6 Transient immunity

Conduct the test on vehicle-mounted speed detectors using DC 12 V or DC 24 V power supply. During the test, the speed detector is under the working condition; the test level is Level-III. During the test and after the test, there shall be no electrical failures; the evaluation of the test result shall comply with the Class-B requirements in GB/T 21437.2. In other words, the speed detector is allowed to perform all its pre-designed functions during the period of disturbance, however, one or several indicators may exceed the specified deviations. After the applied disturbance is stopped, all functions shall be able to automatically return to the normal working range; the data stored in the speed detector shall not be lost.

5.11 Environmental adaptability

5.11.1 High-temperature operation

The speed detector shall be able to withstand a high-temperature test of 70 °C for 24 h. During the test and after the test, there shall be no electrical failures; the appearance shall manifest no obvious deformation; the functions shall remain normal.

5.11.2 Low-temperature operation

The speed detector shall be able to withstand a low-temperature test of -20 °C for 24 h. During the test and after the test, there shall be no electrical failures; the appearance shall manifest no obvious deformation; the functions shall remain normal.

5.11.3 Damp heat

The speed detector shall be able to withstand a constant damp heat test with a temperature of 40 °C, a relative humidity of 93%, and a test cycle of 48 h. During the test and after the test, there shall be no electrical failures; the appearance shall manifest no obvious deformation; the functions shall remain normal.

5.11.4 Salt mist

The speed detector used outdoors shall be able to withstand a salt mist test with a temperature of 35 °C ± 2 °C, a mass fraction of salt mist solution of 5% ± 1%, and a test cycle of 48 h. After the test, use running water to clean the deposits on the surface of the sample, then, place it at room temperature for 1 h. After the test, there shall be no severe corrosion on the surface of the outdoor cabinet of the speed detector and the protective cover containing the image acquisition unit.

6.4.1.1 Test device

The speed detection range of the test device shall at least satisfy 20 km/h ~ 200 km/h; the accuracy shall be more than 3 times that of the speed detector being tested.

6.4.1.2 Test method

Within the test detection range, select speed points near 20 km/h, 60 km/h, 90 km/h, 120 km/h, 150 km/h, 180 km/h and 200 km/h for simulation test. Test each speed point for 3 times, then, check the test results.

6.4.2 Test of radar speed detection unit

6.4.2.1 Test of single-target radar speed detection unit

6.4.2.1.1 Microwave emission frequency error

Use a microwave digital frequency meter to measure the microwave emission frequency of the radar speed detection unit; compare it with the nominal frequency; calculate the microwave emission frequency error.

6.4.2.1.2 Horizontal main lobe width

Place the radar speed detection unit on the turntable of a microwave anechoic chamber or microwave channel; set up the receiving antenna on the other end of the microwave anechoic chamber or microwave channel; maintain them on the same axis. Turn on the spectrum analyzer or microwave power meter of the antenna pattern measurement system to warm up for 30 min or the time required by the manufacturer in the instructions. Then, rotate the turntable; use the spectrum analyzer or microwave power meter to measure the horizontal maximum radiation direction of the microwave signal; respectively rotate the turntable to the left and right. Use the spectrum analyzer or microwave power meter to measure the two directions where the radiated power drops by 3 dB; record the position reading of the turntable; calculate the horizontal main lobe width.

6.4.2.1.3 Sidelobe level

Place the radar speed detection unit on the turntable of a microwave anechoic chamber or microwave channel; set up the receiving antenna on the other end of the microwave anechoic chamber or microwave channel; maintain them on the same axis. Turn on the spectrum analyzer or microwave power meter of the antenna pattern measurement system to warm up for 30 min or the time required by the manufacturer in the instructions. Then, rotate the turntable; use the spectrum analyzer or microwave power meter to measure the horizontal maximum radiation direction of the microwave signal; respectively rotate the turntable to the left and right. Use the spectrum analyzer or microwave power meter to measure the transmitted power of microwave signal at different angles. Obtain the ratio of the maximum value of the sidelobe to the maximum

Adopt actual operation method to verify the self-check function of the loop speed detection unit under normal working conditions.

6.4.4.2 Logic circuit recognition function

The vehicle being tested respectively crosses two adjacent lanes and passes through the loop speed detection area; check whether the speed value is correct.

6.4.5 Test of video analysis speed detection unit

Through the video performance test system, check the frame rate, wide dynamic range and coding delay of video recording by the video analysis speed detection unit.

6.5 Test of Image Acquisition Unit

6.5.1 Picture resolution

Through computer-related software, check the picture resolution.

6.5.2 Horizontal resolution

6.5.2.1 Ambient conditions

The test shall be conducted in a dark room; the color temperature of the light source is (6,500 ± 100) K; the surface illuminance of the test card is (2,000 ± 100) lx; the unevenness shall be less than 5%. The dark room shall have no light leakage. The ambient conditions shall not affect the beam transmission performance and the accuracy of the instruments.

6.5.2.2 Test method

Adjust the distance between the image acquisition unit and the test card, so that the image of the test card can fill the display screen to the greatest extent. Manually adjust the focus to achieve the optimal display effect. Visually observe the position of vertical black-and-white lines in the densest center that can be distinguished in the image on the display devices of the graphics workstation. Read the position value N; ($N \times 100$) TVL is the maximum horizontal resolution.

6.5.3 Minimum illuminance

6.5.3.1 Ambient conditions

The test shall be conducted in a dark room; the dark room shall have no light leakage. The ambient conditions shall not affect the beam transmission performance and the accuracy of the instruments.

6.5.3.2 Test method

km/h and 200 km/h ± 5 km/h. Check the static speed detection range of the speed detector.

6.6.1.3 Dynamic speed detection test

Use two test vehicles for the test. One is the measuring vehicle and the other is the vehicle being tested. Install the speed detect or on the measuring vehicle.

During the test, the measuring vehicle and the vehicle being tested run in the same direction; the speed of the vehicle being tested is 50 km/h ± 2 km/h and 200 km/h ± 5 km/h. Check the dynamic speed detection range of the speed detector.

6.6.2 Test of road test error

Install and debug the speed detector; install the standard speed detector on the test vehicle.

During the test, the test vehicle respectively runs at speed points near 20 km/h, 60 km/h, 90 km/h, 120 km/h and 150 km/h and above 150 km/h. For each speed point, run for 3 times. Compare the speed value detected by the speed detector each time and the standard speed value of the standard speed detector; calculate the speed detection error of the speed detector.

6.6.3 Test of overspeed vehicle capture ratio and effective ratio of overspeed vehicles

Carry out the test of the speed detector under the indicated conditions of use; set the speed limit value of the speed detector to 20 km/h.

Within the range of speed detection, evenly select five speed points for the test vehicle. The number of tests at each speed point shall be no less than 20 times; calculate the overspeed vehicle capture ratio and the effective ratio of overspeed vehicles.

6.6.4 Test of corresponding of speed and picture

Set the speed limit value of the speed detector to 20 km/h. Under the indicated conditions of use, conduct the test of the speed detector:

a) Select a high-speed point in the speed detection range to conduct field test in the detection area; check whether the speed detector can generate a record;

b) In the speed detection area, park the test vehicle. In the effective speed detection area beyond the effective image acquisition area, conduct a field test; check whether the speed detector would generate a record by mistake;

c) For multi-target speed detectors, in the speed detection area, arrange several motor vehicles for field test; check whether the speed detector can generate

6.6.9.2.1 Delayed forensics

The set delayed forensics time shall be not less than 1 min. In accordance with the following steps, conduct the test:

a) Through the test software, send instructions; lower the speed limit value;

b) Within the delayed time, the test vehicle passes through the speed detection point at a speed greater than the modified speed limit value; check whether the speed detector can implement overspeed forensics;

c) When the time exceeds the delayed time, the test vehicle passes through the speed detection point at a speed greater than the modified speed limit value; check whether the speed detector can implement overspeed forensics.

6.6.9.2.2 Requirements for images

Use relevant software to check the images collected by the speed detector.

6.6.10 Test of clock synchronization and timing error

Modify the local clock of the speed detector; check the clock synchronization function of the speed detector. The speed detector continuously works for 24 h; compare the speed detector timing with the standard timing; calculate the timing error of the speed detector.

6.6.11 Data transmission test

6.6.11.1 Networked data transmission test method

Use computer to simulate a designated data center; through the network, connect it to the speed detector. Test its networked data transmission function. During the test, network interruption failures may be simulated.

6.6.11.2 On-site data download test method

Through manual or automatic mode, download the motor vehicle overspeed information recorded by the speed detector to the storage medium; check whether the speed detector can generate download log information.

6.6.12 Test of fill light requirements

In accordance with the test method of GA/T 1202, conduct the test.

6.6.13 Test of license plate recognition

6.6.13.1 Test of character recognition

Carry out the test under the conditions of fine weather without any fog, and with no obstruction or fouling of the license plate. During the daytime test, the ambient illuminance shall be not lower than 200 lx; during the nighttime test, the auxiliary lighting illuminance shall be not higher than 50 lx. The test lane is a single lane, with a width of 3.75 m.

6.7.2 Test of point-to-point speed detection information collection

During the test, conduct the test on the test vehicle at speed points near 20 km/h, 60 km/h, 90 km/h and 120 km/h. For each speed point, test for not less than 20 times. Calculate the vehicle image capture ratio of the image acquisition and processing unit of the starting point and end point of the point-to-point speed detection.

6.7.3 Test of license plate recognition

Conduct the test in accordance with the test method in 6.6.13.

6.7.4 Test of clock synchronization and timing error

Modify the local clock of the image acquisition and processing unit of the starting point or end point; check the clock synchronization function of the image acquisition and processing unit of the starting point and end point. The speed detector continuously works for 24 h. Compare the timing of the image acquisition and processing unit of the starting point and end point with the standard timing; calculate the timing error.

6.7.5 Test of speed detection range

Install and debug the speed detector. Install the standard clock and display device on the measuring vehicle.

Set the point-to-point distance; calculate the corresponding time when the average speed is 20 km/h and 200 km/h. During the test, the test vehicle respectively passes through the point-to-point speed detection area at the corresponding times; check the speed detection range of the speed detector.

6.7.6 Test of average speed error

Install and debug the speed detector. Install the standard speed detector on the measuring vehicle.

During the test, evenly select 3 ~ 5 speed points in the speed detection range for the field test of the test vehicle. Compare the speed value detected by the speed detector each time with the standard speed value of the standard speed detector; calculate the speed detection error of the point-to-point speed detection system. During the simulation test, compare the standard simulated speed value with the actual speed value.

During the test, the test vehicle respectively runs at speed points near 20 km/h, 60 km/h, 90 km/h, 120 km/h and 150 km/h, and above 150 km/h. For each speed point, run for 3 times. Compare the speed value detected by the speed detector each time with the standard speed value of the standard speed detector; calculate the speed detection error of the speed detector.

6.8.4 Test of positioning performance

The positioning accuracy of RTK plane of the positioning accuracy test equipment shall be not lower than: additive constant: 1 cm; multiplying constant: one millionth of the distance between the reference station and the roving station.

In accordance with the conditions of use, install the speed detector on the test vehicle. Under the condition that the positioning is completed and the confidence interval is not less than 95%, test the maximum positioning error of the speed detector. During the test, the test vehicle runs at a speed of not less than 20 km/h; the continuous test time is not less than 1 h. There shall be no continuous curves in the test section and no shielding or interference that would significantly affect the continuous positioning.

6.8.5 Test of timing error

The speed detector continuously works for 24 h. Compare the speed detector timing with the standard timing; calculate the timing error of the speed detector.

6.9 Test of extended functions

6.9.1 Test of driver’s facial feature recording

Visually check whether the driver’s facial features are distinct. In addition, use relevant software to check the pixels in the facial feature area.

6.9.2 Test of overspeed alarm

Set the alarm speed value of the speed detector. Conduct the test on the test vehicle in accordance with the following steps:

a) The test vehicle passes through the speed detection area at a speed greater than the alarm speed value; check whether the speed detector can send out an alarm message;

b) The test vehicle passes through the speed detection area at a speed lower than the alarm speed value; check whether the speed detector sends out an alarm message by mistake.

6.9.3 Test of running status monitoring

When the speed detector is normally working, check the status information uploaded

6.10.3 Test of pressure resistance

The speed detector is not energized; the switch is placed in the on-position.

Between the power electrode or other conductive circuits and accessible parts (excluding lightning protection devices), such as: cabinets and installation cases, apply a 1,500 V, 50 Hz of test voltage. In 5 s ~ 10 s, raise from 0 V to 1,500 V; maintain for 1 min. Check the pressure resistance of the speed detector.

6.10.4 Test of contact resistance

The speed detector is not energized; the switch is placed in the on-position.

Between the grounding terminal (or grounding contact) of the speed detector and the cabinet shell or accessible metal parts, apply a current of not less than 10 A generated by no-load voltage (not exceeding 12 V); determine the ground resistance.

6.11 Electromagnetic Immunity Performance Test

6.11.1 Electrostatic discharge immunity test

6.11.1.1 Test device

The electrostatic discharge generator used for the test shall comply with the requirements of GB/T 17626.2.

6.11.1.2 Test method

The speed detector is energized and normally working; in accordance with the requirements of use, the case is grounded. The test configuration shall comply with the requirements of GB/T 17626.2. Select the surface that is easily accessible to the operator during the normal use of the speed detector as the discharge point for the discharge test. The test rate is discharge once in 2 s. Each discharge point shall respectively discharge 10 times to the positive polarity and the negative polarity. The test level is Level-2. After the test, check whether the basic functions of the speed detector are normal, and whether the stored images and data are lost.

6.11.2 Electrical fast transient / burst immunity test

6.11.2.1 Test device

The electrical fast transient pulse group generator used for the test shall comply with the requirements of GB/T 17626.4.

6.11.2.2 Test method

The speed detector is energized and normally working; in accordance with the requirements of use, the case is grounded. The test configuration shall comply with the

6.11.5.2 Test method

Conduct the test in accordance with the method specified in GB/T 17626.3. The test level is Level-2. After the test, check whether the basic functions of the speed detector are normal, and whether the stored images and data are lost.

6.11.6 Test of transient immunity

6.11.6.1 Test device

The equipment used for the test shall comply with the requirements of GB/T 21437.2.

6.11.6.2 Test method

Conduct the test in accordance with the method specified in GB/T 21437.2. The test pulse shall select 1, 2a, 2b, 3a, 3b, 4, 5a and 5b. The test level is Level-III. After the test, check whether the basic functions of the speed detector are normal, and whether the stored images and data are lost.

6.12 Test of Environmental Adaptability

6.12.1 Test of high-temperature operation

6.12.1.1 Test equipment

The test equipment shall comply with the requirements of GB/T 2423.2.

6.12.1.2 Test method

Place the speed detector into a high-temperature test chamber. At a temperature of 70 °C ± 2 °C, continuously energize and operate it for 24 h. During the test and after the test, check its appearance and functions.

6.12.2 Test of low-temperature operation

6.12.2.1 Test equipment

The test equipment shall comply with the requirements of GB/T 2423.1.

6.12.2.2 Test method

Place the speed detector into a low-temperature test chamber. At a temperature of -20 °C ± 2 °C, continuously energize and operate it for 24 h. During the test and after the test, check its appearance and functions.

6.12.3 Damp heat test

6.12.3.1 Test equipment

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