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Electronic locks device for motor vehicles

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Foreword

This document is drafted in accordance with the provisions of GB/T 1.1-2020 Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardization Documents.

This document supersedes QC/T 627-2013 Automotive Electric Door Lock Devices. Compared with QC/T 627-2013, in addition to structural adjustments and editorial revisions, the main technical changes are as follows:

Revised Terms and Definitions (see 3.1, Clause 3.1 of the 2013 edition);

Added functional requirements (see 4.1);

Added requirements for appearance and materials (see 4.2);

Added load requirements (see 4.3.2) and corresponding test methods (see 5.3);

Added low-temperature storage resistance requirements (see 4.3.3) and corresponding test methods (see 5.4);

Deleted low-temperature operating resistance requirements (see Clause 4.3.3 of the 2013 edition);

Revised temperature change resistance requirements (see 4.3.4, Clause 4.3.4 of the 2013 edition);

Revised overload strength requirements (see 4.3.5, Clause 4.3.5 of the 2013 edition) and corresponding test methods (see 5.6, Clause 5.6 of the 2013 edition);

Added acoustic quality requirements (see 4.3.11) and corresponding test methods (see 5.12);

Added corrosion resistance requirements (see 4.3.12) and corresponding test methods (see 5.13);

Deleted damp-heat resistance requirements (see Clause 4.3.11 of the 2013 edition);

Revised durability requirements (see 4.3.13, Clause 4.3.12 of the 2013 edition) and corresponding test methods (see 5.14, Clause 5.13 of the 2013 edition);

Revised test conditions (see 5.1, Clause 5.1 of the 2013 edition);

Added an informative appendix (see Appendix A).

Attention is drawn to the possibility that some elements of this document may be the subject of patent rights. The issuing body of this document shall not be responsible for identifying any such patent rights.

This document is proposed and administered by the National Technical Committee of Standardization for Automobiles (SAC/TC114).

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The previous versions of the document superseded by this edition are listed as follows:

First issued in 1999;

First revised in 2013;

This is the second revision.

Electronic locks device for motor vehicles

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of automotive electric door lock devices.

This document applies to the electric door lock devices for automotive doors of Class M1 and Class N1 vehicles that perform rotational movement around hinge axes, translational sliding or swinging movement. The electric door lock devices for other types of vehicles shall be implemented by reference.

2 Normative References

The contents of the following documents are incorporated into this document as essential provisions through normative reference in the text. For dated referenced documents, only the edition corresponding to that date applies to this document; for undated referenced documents, the latest edition (including all amendments) applies to this document.

GB/T 191 Packaging and Storage Pictorial Markings

GB/T 4208-2017 Degrees of Protection Provided by Enclosures (IP Code)

GB/T 10125 Corrosion Tests in Artificial Atmospheres—Salt Spray Tests

GB 15086 Performance Requirements and Test Methods for Automotive Door Locks and Door Retainers

GB/T 30512 Requirements for Restricted Substances in Automobiles

GB 34660 Road Vehicles—Electromagnetic Compatibility Requirements and Test Methods

3 Terms and Definitions

The terms and definitions specified in GB 15086 and the following apply to this document.

3.1 electric door lock device

A device with one or more electric door lock functions, including electric and manual locking/unlocking, latching/unlatching, child lock engagement/release, etc.

Note: It includes electric actuators, locking mechanisms, unlocking mechanisms, latching mechanisms, child lock mechanisms and strikers.

3.2 controller

An electronic module that controls the operation of electrical components such as electric actuators.

3.4 opening and closing cycle

For an electric door lock device under normal operating conditions, it refers to the process in which each actuator or manually driven mechanism travels from one end of the stroke to the other and then returns to the initial position during the completion of its function.

4 Technical Requirements

4.1 Functional Requirements

4.1.1 All functional mechanisms of the electric door lock device shall be equipped with manual and electric control functions.

4.1.2 When the electric function of the electric door lock device fails, the door lock device shall be capable of being manually opened or closed.

4.1.3 When the child protection system is engaged and the corresponding door is not opened, only the occupants in the front seats and personnel outside the vehicle shall be allowed to release the child lock or open the door with the child lock engaged. Occupants in other positions inside the vehicle shall not be able to unlock the child protection system or open the corresponding door lock.

4.1.4 Where the electric door lock device is provided with an automatic latching function and is latched automatically, the electric door lock device on the non-collision side shall be in the unlocked state after a collision test.

4.2 Appearance and Materials

4.2.1 The surface of plastic components of the electric door lock device shall be flat, free of bubbles and free of deformation that affects use.

4.2.2 Metal components of the electric door lock device shall undergo anti-corrosion treatment or be made of corrosion-resistant materials. The coating, plating and chemical treatment layers of metal components shall be uniform and free of obvious defects.

4.2.3 The restricted substances in the electric door lock device shall comply with the provisions of GB/T 30512.

4.3 Performance Requirements

4.3.1 Basic Performance

Electric door lock devices with a nominal voltage of DC 12V shall be able to fully perform manual and all electric-driven functions within the operating voltage range of 9V to 16V, without jamming or abnormal phenomena. Electric door lock devices with a nominal voltage of DC 24V shall be able to fully perform manual and all electric-driven functions within the operating voltage range of 18V to 32V, without jamming or abnormal phenomena.

4.3.2 Load

The load requirements for door locks shall comply with the provisions of GB 15086.

4.3.3 High and Low Temperature Storage Resistance

4.3.3.1 After being stored at 80℃ for at least 8 hours, the electric door lock device shall immediately undergo the basic

performance test and meet the requirements specified in 4.3.1.

4.3.3.2 After being stored at -40℃ for at least 8 hours, the electric door lock device shall immediately undergo the basic performance test and meet the requirements specified in 4.3.1.

4.3.4 Temperature Change Resistance

When not in operation, the electric door lock device shall undergo a temperature cycle test ranging from -40℃ to 80℃. After returning to room temperature, the device shall meet the requirements specified in 4.3.1.

4.3.5 Overload Resistance Strength

Under high temperature and high voltage conditions, the electric door lock device shall have overload resistance capacity for all electric functions. After the test, the device shall meet the requirements specified in 4.3.1.

4.3.6 Overvoltage Resistance

The electric door lock device shall have overvoltage resistance capacity. After the test, the device shall meet the requirements specified in 4.3.1.

4.3.7 Vibration Resistance

The electric door lock device shall withstand sweep frequency vibration tests in the X, Y and Z directions. After the test, the device shall meet the requirements specified in 4.3.1.

4.3.8 Dielectric Strength of Insulation

Mutually disconnected conductive components inside the electric door lock device shall be able to withstand a sinusoidal waveform high voltage withstand test (rms value) against the housing, without insulation breakdown. After the test, the device shall meet the requirements specified in 4.3.1.

4.3.9 Electromagnetic Compatibility

The electromagnetic compatibility of the electric door lock device shall comply with the provisions of GB 34660.

4.3.10 Waterproof Performance

The waterproof performance grade of the electric door lock device shall not be lower than IPX4 as specified in GB/T 4208. After the test, the device shall meet the requirements specified in 4.3.1.

4.3.11 Acoustic Quality

The operating noise of the electric door lock device shall not exceed 65 dB(A), and the noise during locking and unlocking shall not exceed 75 dB(A).