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**QC**

AUTOMOBILE INDUSTRY STANDARD  
OF THE PEOPLE'S REPUBLIC OF CHINA

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**QC/T 1082-2017**

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**Electromotor for automobile electrical power steering**

汽车电动助力转向装置用电动机

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**Attachment:**

**Number, name and date of implementation of 22 automotive industry standards**

No.	Standard number	Standard name	Number of standard replaced	Date of implementation
301	QC/T 727-2017	Instrument for automobile and motorcycle	QC/T 727-2007	2017-10-01
302	QC/T 803-2017	Oxygen sensor for automobile	QC/T 803.1-2008	2017-10-01
303	QC/T 1072-2017	Gear position sensor for automobiles		2017-10-01
304	QC/T 1073.1-2017	Accelerometers for automobiles - Part 1: Linear accelerometers		2017-10-01
305	QC/T 1074-2017	Technical specifications for automotive parts remanufacturing products		2017-10-01
306	QC/T 1075-2017	Technical conditions for metal honeycomb carrier of exhaust catalytic converter		2017-10-01
307	QC/T 777-2017	Technical conditions for electromagnetic fan clutch of automobile	QC/T 777-2007	2017-10-01
308	QC/T 1076-2017	Performance requirements and test methods for continuously variable transmission (CVT)		2017-10-01
309	QC/T 1077-2017	Terminology and definitions for classification of automatic control transmission for automobile		2017-10-01
310	QC/T 1078-2017	Advertising vehicle		2017-10-01
311	QC/T 1079-2017	Suction & delivery vehicle		2017-10-01
312	QC/T 1080-2017	Mobile loudspeaker for popularization of science		2017-10-01
313	QC/T 1081-2017	Electric power steering device for automobile		2017-10-01
314	QC/T 1082-2017	Motor for electric power steering device of automobile		2017-10-01
315	QC/T 1083-2017	Controller for electric power steering device of automobile		2017-10-01
316	QC/T 1084-2017	Sensor for electric power steering device of automobile		2017-10-01
317	QC/T 1085-2017	X-ray testing for light-alloy wheel of motorcycle		2017-10-01
318	QC/T 1086-2017	Technical conditions for range extenders for electric vehicles		2017-10-01

## Table of Contents

Foreword .....	7
1 Scope .....	8
2 Normative references .....	8
3 Terms and definitions.....	9
4 Technical requirements.....	10
5 Test methods .....	13

# Electromotor for automobile electrical power steering

## 1 Scope

This standard specifies the general requirements, technical requirements, test methods for electromotor for automobile electrical power steering.

This standard applies to electromotor for automobile electrical power steering (hereinafter referred to as motors).

## 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) are applicable to this standard.

GB 755 Rotating electrical machines - Rating and performance

GB/T 2423.1 Environmental testing for electric and electronic 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 2423.17 Environmental testing for electric and electronic products - Part 2: Test method - Test Ka: Salt mist

GB/T 2423.22 Environmental testing - Part 2: Tests methods - Test N: Change of temperature

GB/T 5179 Terms and definitions of automotive steering system

GB/T 2423.34 Environmental testing - Part 2: Test methods - Test Z/AD: Composite temperature/humidity cyclic test

GB/T 4942.1 Degrees of protection provided by the integral design of rotating electrical machined (IP code) - Classification

GB 7345 General requirements for electrical machine for automatic control

### 3.6

#### **Moment of inertia, J**

A measure of the inertia (the characteristic that a rotating object maintains its uniform circular motion or stationary) as the rotating member rotates about the axis.

## **4 Technical requirements**

### **4.1 General requirements**

#### **4.1.1 Motor.**

The motor is manufactured in accordance with the product drawings and technical documents as approved by the prescribed procedures.

#### **4.1.2 Working temperature.**

The motor shall be able to operate normally within the temperature range of -40 °C ~ +85 °C or +105 °C (the motor for electric power steering is installed outside the cab).

#### **4.1.3 Relative humidity.**

The relative humidity that the motor can withstand shall be  $\leq 95\%$  RH.

#### **4.1.4 Working voltage.**

##### **4.1.4.1 Nominal voltage: 12 V or 24 V.**

##### **4.1.4.2 Allowable voltage variation range:**

- a) 10.8 V ~ 16 V (nominal voltage 12 V);
- b) 21.6 V ~ 32 V (nominal voltage 24 V).

#### **4.1.5 Direction of rotation of motor.**

Clockwise and counterclockwise alternate in both directions.

#### **4.1.6 The motor is a short-time working system.**

According to the provisions of GB 755, The S2 is 3 min.

#### **4.1.7 Requirements of testing instruments and equipment.**

**4.1.7.1** Within the temperature range of  $23\text{ °C} \pm 5\text{ °C}$ , the measurement accuracy of the torque, force, speed, current, voltage shall not be less than 0.5%

The noise at rated speed shall meet the manufacturer's requirements.

#### **4.2.5** Insulation's withstanding voltage performance and insulation resistance.

##### **4.2.5.1** Insulation's withstanding voltage performance.

The motor is not allowed to have spark flashing or breakdown.

##### **4.2.5.2** Insulation resistance.

At room temperature, the insulation resistance between the lead wire of the motor and the casing shall be  $\geq 50 \text{ M}\Omega$ . After the combined temperature/humidity cyclic test, the insulation resistance between the lead wire of the motor and the casing shall be  $\geq 1 \text{ M}\Omega$ .

#### **4.2.6** Static friction torque and fluctuations.

The static friction torque and fluctuation of the motor shall meet the manufacturer's requirements.

### **4.3 Environment**

#### **4.3.1** Temperature shock.

After the test, the motor shall be able to work normally and shall meet the requirements of 4.2.1.

#### **4.3.2** Combined temperature/humidity cycle.

After the test, the motor shall be able to work normally and shall meet the requirements of 4.2.1.

#### **4.3.3** Corrosion resistance.

**4.3.3.1** After the corrosion resistance test, the motor shall be able to work normally and shall meet the requirements of 4.2.1.

**4.3.3.2** The area of white spot of surface corrosion shall not exceed 20%. It does not allow for red rust spots (only the exposed parts of the motor and device after assembly are evaluated).

**4.3.3.3** The surface protection layer shall meet the requirements of TQ6 in QC/T 484.

#### **4.3.4** Dustproof and waterproof.

When the motor is installed outside the cab, the motor (only the exposed parts of the motor and the device after assembly are evaluated) shall meet the requirements for dustproof and waterproof. The degree of protection shall reach

IP65.

#### **4.4 Durability and mechanical strength**

##### **4.4.1 Durability (environmental operating life).**

**4.4.1.1** After the motor is subjected to durability test, it shall meet the requirements of 4.2.1.

**4.4.1.2** The change of noise after the test shall be  $\leq 30\%$ .

##### **4.4.2 Vibration.**

**4.4.2.1** After the motor is subjected to vibration test, it is not allowed to have visible crack or fracture.

**4.4.2.2** It shall meet the requirements of 4.2.1.

### **5 Test methods**

#### **5.1 Test conditions**

##### **5.1.1 Temperature deviation.**

This standard specifies that the temperature deviation in the test method shall be  $\pm 2\text{ }^{\circ}\text{C}$ , unless otherwise specified.

##### **5.1.2 Test voltage.**

This standard specifies a test voltage of  $12\text{ V} \pm 0.5\text{ V}$  (nominal voltage 12 V) or  $24\text{ V} \pm 1\text{ V}$  (nominal voltage 24 V), unless otherwise specified.

##### **5.1.3 DC power supply for test.**

It may use the automotive battery or otherwise the DC regulated power supply which has a parallel ripple coefficient  $\leq 0.5\%$ .

##### **5.1.4 Installation of motor.**

The motor is mounted flat on the test bench, unless otherwise specified.

#### **5.2 Performance**

##### **5.2.1 Basic performance of motor.**

**5.2.1.1** After the motor is powered on, apply the rated voltage. Measure the unloaded speed  $n_0$  and the unloaded current  $I_0$ .

**5.2.1.2** After the motor is powered on, apply the rated voltage and set the rated