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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

# 中华人民共和国国家标准

GB/T 18488.1-2006
Replace GB/T 18488.1-2001

# The Electrical Machines and Controllers for Electric Vehicles—Part 1: General Specification

# 电动汽车用电机及其控制器 第 1 部分：技术条件

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**Standardization Administration of the People's Republic of China**

# Contents

# Foreword

GB/T 18488 *The electrical machines and controllers for electric vehicles* is divided into two Parts:

— Part 1: General specification

— Part 2: Test methods.

This Standard is part 1 of GB/T 18488.

This Standard is revision of GB/T 18488.1-2001, will replace GB/T 18488.1-2001 *General specification of the electrical machines and controllers for electric vehicles* since implementation date.

Main changes of this Standard are as follows:

1) Added relevant Normative References, mainly includes GB/T 19596-2004, QC/T 413-2002 and GB/T 3859.1-1993.
2) Deleted the Article “3 Definition” in previous version.
3) Supplemented for Clause 4 and Clause 5 in previous version, mainly added the specific contents of duty type S1 to S9.

Annex A and Annex B of this Standard is informative annex.

This Standard was proposed by National Technical Committee on Road Vehicles of Standardization Administration of China.

This Standard was under the jurisdiction of National Technical Committee on Road Vehicles of Standardization Administration of China.

Draft units of this Standard are Institute of Electrical Engineering, CAS, BIT (Beijing Institute of Technology) and Zhuzhou Electric Locomotive Research Institute.

Main drafters of this Standard are Wen Xuhui, Liu Tongyan, Guo Shuying, Zhang Chengning, Liu Jun and Ju Long.

The previous edition of the part replaced by these following one:

— GB/T 18488.1-2001.

# The Electrical Machines and Controllers for Electric Vehicles—

# Part 1: General Specification

## 1 Scope

This Standard specifies the duty, quota, environmental condition, technical requirements, inspection test items and type approval test and so on of the electrical machines and controllers for electric vehicles.

This Standard is applicable to the electrical machines and controllers for electric vehicles.

Unspecified items of electrical machines in this Standard shall be in accordance with GB 755-2000. If had particular requesting, the user and the manufacture may specifies the requirements in special technical agreement.

Unspecified items of electrical machines in this Standard shall be in accordance with GB/T 3859.1-1993. If had particular requesting, the user and the manufacture may specifies the requirements in special technical agreement.

## 2 Normative References

The articles contained in the following documents have become this standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

GB 755-2000 Rotating electrical machines--Rating and performance (idt IEC 60034-1: 1996)

GB/T 2423.17-1993 Basic environmental testing procedures for electric and electronic products Test Ka: Salt mist (eqv IEC 60068-2-11: 1981)

GB/T 3859.1-1993 Semiconductor convertors—Specification of basic requirements (eqv IEC 60146-1-1: 1991)

GB/T 4772.1-1999 Dimensions and output series for rotating electrical machines -Part 1:Frame numbers 56 to 400 and flange numbers 55 to 1080

GB/T 4942.1-2006 Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification (IEC 60947-1: 2000, IDT)

GB/T 4942.2-1993 Degrees of protection provided by enclosures for low-voltage apparatus (eqv IEC 60947-1: 1988)

GB 10068-2000 Mechanical vibration of certain machines with shaft heights 56mm and higher--Measurement, evaluation and limits of vibration (idt IEC 60034-14: 1996)

GB 10069.3-2006 Measurement of airborne noise emitted by rotating electrical machines and the noise limits—Part 3: Noise limits (IEC 60034-9: 1997, IDT)

GB/T 12113-2003 Methods of measurement of touch current and protective conductor current (IEC 60990: 1999, IDT)

GB/T 12665-1990 Requirements of damp-heat testing of electrical machine for service in general environmental condition

GB 14023-2006 Vehicles boats and internal combustion engine driven devices—Radio

disturbance characteristics — Limits and methods of measurement (CISPR 12: 2005, IDT)
GB 14711-2006 Safety requirements of small and medium size rotating electrical machines
GB/T 17619-1998 Limits and methods of testing for immunity of electrical / electronic sub-assemblies in vehicles to electromagnetic radiation
GB/T 19596-2004 Terminology of electric vehicles (ISO 8713: 2002, NEQ)
QC/T 413-2002 Basic Technical Requirements for Automotive Electric Equipment

## 3 Duty and Quota

**3.1** Duty
**3.1.1** Duty S1—Continuous duty
The machine will operate to the heat stable state under constant load, see Figure 1.
This duty is called S1 for short.
**3.1.2** Duty S2—Short-time duty
When the machine operates under rated load, periodical overload is allowable, the duration of overload, duration of each overload, time interval and the whole operation time shall be specified in the product standards, see Figure 2.
This duty is called as S2 for short and the duration shall be marked subsequently.
For example: S2 60min.
**3.1.3** Duty S3 — Intermittent and periodic duty
The machine will operate according to a series of similar work periods, each period includes certain time of constant load operation and the time of machine halt and energy break, see Figure 3.
In this duty, the starting current in each period shall not cause obvious impact on the temperature rise.
This duty is called S3 for short, and the load duration factor shall be marked subsequently.
For example: S3 25%.
**3.1.4** Duty S4—Intermittent and periodic duty including the starting
The machine will operate according to a series of similar work periods, each period includes certain starting time that has obvious impact on the temperature rise, certain time of constant load operation and time of machine halt and energy break, see Figure 4.
This duty is called S4 for short, the load duration factor, the rotary inertia $J_M$ reduced on the electric machine spindle and the load rotary inertia $J_{ext}$ shall be marked subsequently.
For example: S4 25% $J_M = 0.15\ kg \cdot m^2$ , $J_{ext} = 0.7\ kg \cdot m^2$
**3.1.5** Duty S5—Intermittent and periodic duty including the electric braking
The machine will operate according to a series of similar work periods, each period includes certain starting time, certain time of constant load operation time, time of electric braking and time of machine haul and energy break, see Figure 5.
This duty is called S5 for short, the load duration factor, the rotary inertia $J_M$ reduced on the electric machine spindle and the load rotary inertia $J_{ext}$ shall be marked subsequently.
For example: S5 25% $J_M = 0.15\ kg \cdot m^2$ , $J_{ext} = 0.7\ kg \cdot m^2$
**3.1.6** Duty S6—Constant period duty
The machine will operate according to a series of similar work periods, each period includes certain time of constant load operation and certain time of non-load operation, not including the time of machine halt and energy break, see Figure 6.

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