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Replace GB 5226.1-2002

**Electrical safety of machinery - Electrical equipment of
machines - Part 1: General requirements**

机械电气安全 机械电气设备 第1部分：通用技术条件

(IEC 60204-1: 2005, Safety of machinery - Electrical equipment of machines -
Part 1: General requirements, IDT)

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Foreword

All technical contents of this Part are mandatory.

GB 5226 *Electrical safety of machinery - Electrical equipment of machines* divided into following parts:

- *Part 1: General requirements;*
- *Part 11: Requirements for HV equipment for voltages above 1000Va.c. or 1500Vd.c. and not exceeding 36kV;*
- *Part 31: Particular safety and EMC requirements for sewing machines, units and systems;*
- *Part 32: Requirements for hoisting machines;*
- *Part 33: Special requirements of semiconductor for special-purpose equipment.*

This is Part 1 of GB 5226.

This Part is identical to IEC 60204-1: 2005 *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* (Fifth edition)

This Part will replace GB 5226.1-2002 *Safety of machinery—Electrical equipment of machines—Part 1: General requirements*.

Comparison with GB 5226.1-2002, main changes of this Part are as follows:

- Enlarged the scope, not the only apply to electric and electronic equipment and system, also apply to programmable equipment and system;
- Stipulated the protective earthing of mobile machine;
- Raised additive protective earthing requirements for electronic equipment which leakage current exceed 10mA a.c. or d.d.;
- Added the safety requirements for control function;

- Added the relevant explanation and condition for automatically power off, stipulated the TN system test;
- Deleted the Clause of electronic equipment (Clause 11 in GB 5226.1-2002);
- Added two annex to protective of system indirect contact and common conductor sectional area.

Annex A of this Part is normative annex, annex B, C, D, E, F and G of this Part are informative annex.

This Standard is proposed by China Machinery Industry Federation

This Standard is under the jurisdiction of National Technical Committee (SAC/TC 231) on Electrical Systems of Industrial Machinery of Standardization Administration of China.

The responsible drafting organizations are Beijing Machine Tool Research Institute and Beijing KND CNC Technology Co., Ltd.

The Participate drafting organizations are Hangzhou Machine Tool Group Co., Ltd, Shenyang Institute of Calculation Technology of Chinese Academy of Sciences, China Textile Machinery Co., Ltd, Changsha Construction Machinery Research Institute, Zhejiang Kaida Machine Tool Co., Ltd, Juche Group Co., Ltd, Sitong Technology Development Co., Ltd of Suzhou Industrial Park.

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This standard replaces the following historical editions issued:

- JB 2738-1980;
- GB 5226.1-1985;
- GB/T 5226.1-1996;
- GB 5226.1-2002.

IEC FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60204-1 has been prepared by technical committee 44: Safety of machinery - Electrotechnical aspects.

This fifth edition cancels and replaces the fourth edition issued in 1997 and Amendment 1 (1999). This edition constitutes a technical revision. It incorporates material from the fourth edition, amended to provide general requirements for machines, including mobile machines and complex (for example large) machine installations.

FDIS	Report on voting
44/494/FDIS	44/502/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The following differences exist in some countries:

4.3.1: The voltage characteristics of electricity supplied by public distribution systems in Europe are given in EN 50160:1999 *Voltage characteristics of electricity supplied by public distribution systems*.

5.1: Exception is not allowed (USA).

5.1: TN-C systems are not permitted in low-voltage installations in buildings (Norway).

5.2: Terminals for the connection of the protective earthing conductors may be identified by the colour green, the letters “G” or “GR” or “GRD” or “GND”, or the word “ground” or “grounding”, or with the graphical symbol GB/T 5465.2-2008 (DB: 2002-10) or any combination (USA).

6.3.3 b), 13.4.5 b), 18.2.1: TT power systems are not allowed (USA).

7.2.3: Disconnection of the neutral conductor is mandatory in a TN-S system (France and Norway).

7.2.3: Third paragraph: distribution of a neutral conductor with an IT system is not allowed (USA and Norway).

9.1.2: Maximum nominal a.c. control circuit voltage is 120 V (USA).

12.2: Only stranded conductors are allowed on machines, except for 0,2 mm solid conductors within enclosures (USA).

12.2: The smallest power circuit conductor allowed on machines is 0,82 mm (AWG 18) in multiconductor cables or in enclosures (USA).

Table 5: Cross-sectional area is specified in ANSI/NFPA 79 using American Wire Gauge (AWG) (USA). See Annex G.

13.2.2: For the protective conductor, the colour identification GREEN (with or without

YELLOW stripes) is used as equivalent to the bicolour combination GREEN-AND-YELLOW (USA and Canada).

13.2.3: The colour identification WHITE or GREY is used for earthed neutral conductors instead of the colour identification BLUE (USA and Canada).

15.2.2: First paragraph: Maximum value between conductors 150 V (USA).

15.2.2: 2nd paragraph, 5th bullet: The full load current rating of lighting circuits does not exceed 15 A (USA).

16.4: Nameplate marking requirements (USA).

IEC 60204 consists of the following parts, under the general title Safety of machinery - Electrical equipment of machines:

Part 1: General requirements

Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1500 V d.c. and not exceeding 36 kV

Part 31: Particular safety and EMC requirements for sewing machines, units and systems

Part 32: Requirements for hoisting machines

Part 33: Particular requirements for semiconductor manufacturing equipment

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

This part of GB 5226 provides requirements and recommendations relating to the electrical equipment of machines so as to promote:

- safety of persons and property;
- consistency of control response;
- ease of maintenance.

Guidance on the use of this part is given in Annex F.

Figure 1 has been provided as an aid to the understanding of the inter-relationship of the various elements of a machine and its associated equipment. Figure 1 is a block diagram of a typical machine and associated equipment showing the various elements of the electrical equipment addressed in this part. Numbers in parentheses () refer to Clauses and Subclauses in this part. It is understood in Figure 1 that all of the elements taken together including the safeguards, tooling/fixtures, software, and the documentation, constitute the machine, and that one or more machines working together with usually at least one level of supervisory control constitute a manufacturing cell or system.

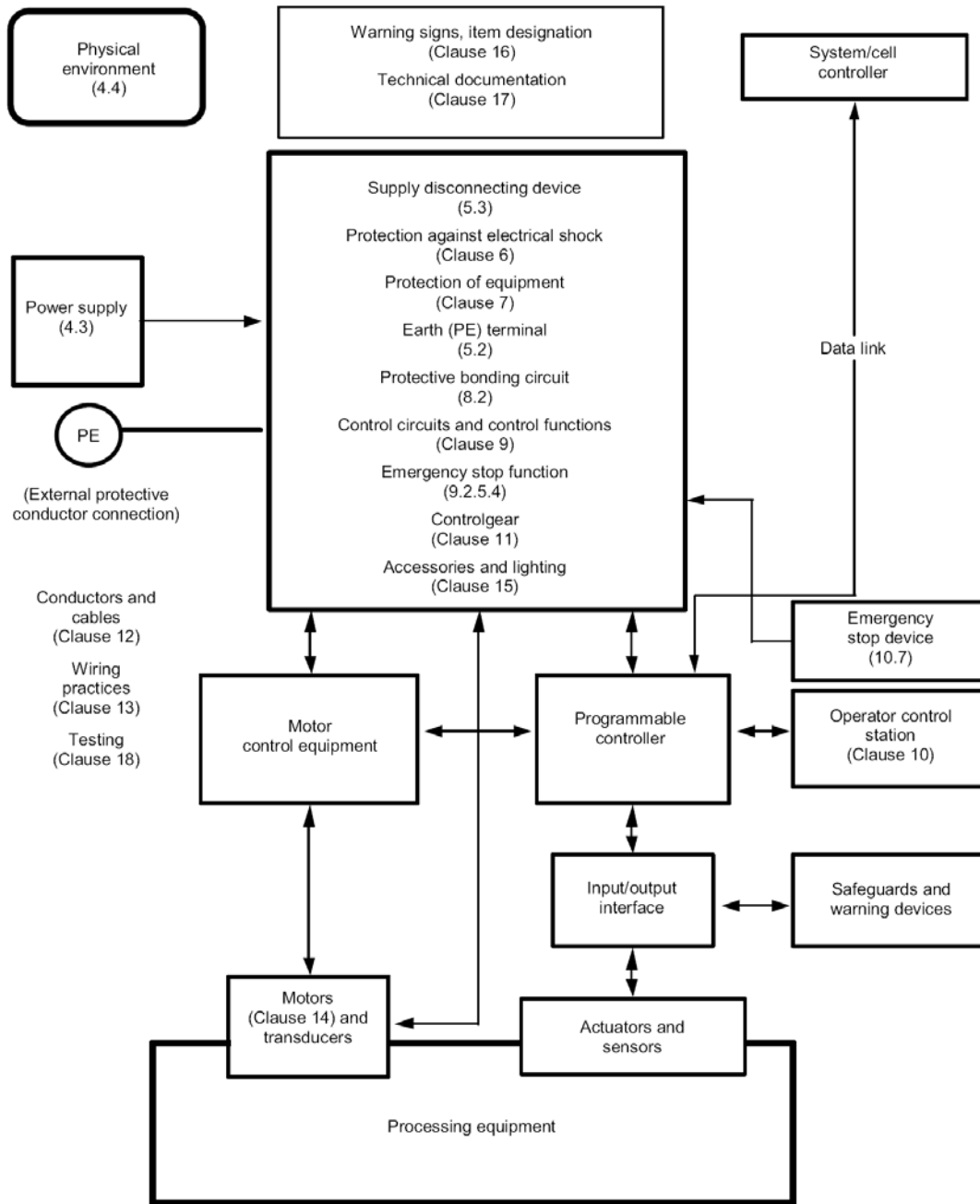


Figure 1 – Block diagram of a typical machine

Electrical safety of machinery - Electrical equipment of machines - Part 1: General requirements

1 Scope

This part of GB 5226 applies to the application of electrical, electronic and programmable electronic equipment and systems to machines not portable by hand while working, including a group of machines working together in a co-ordinated manner.

NOTE 1 This part of GB 5226 is an application standard and is not intended to limit or inhibit technological advancement.

NOTE 2 In this part, the term electrical includes electrical, electronic and programmable electronic matters (i.e. electrical equipment means electrical, electronic and programmable electronic equipment).

NOTE 3 In the context of this part, the term person refers to any individual and includes those persons who are assigned and instructed by the user or his agent(s) in the use and care of the machine in question.

The equipment covered by this part of GB 5226 commences at the point of connection of the supply to the electrical equipment of the machine (see 5.1).

NOTE 4 The requirements for the electrical supply installation in buildings are given in the GB16895/IEC 60364 series.

This part is applicable to the electrical equipment or parts of the electrical equipment that operate with nominal supply voltages not exceeding 1 000 V for alternating current (a.c.) and not exceeding 1 500 V for direct current (d.c.), and with nominal supply frequencies not exceeding 200 Hz.

NOTE 5 For higher voltages, see GB 5226.3.

This part does not cover all the requirements (for example guarding, interlocking, or control) that are needed or required by other standards or regulations in order to protect persons from hazards other than electrical hazards. Each type of machine has unique

requirements to be accommodated to provide adequate safety.

This part specifically includes, but is not limited to, the electrical equipment of machines as defined in 3.35.

NOTE 6 Annex C lists examples of machines whose electrical equipment can be covered by this part of GB 5226.

This part does not specify additional and special requirements that can apply to the electrical equipment of machines that, for example:

- are intended for use in open air (i.e. outside buildings or other protective structures);
- use, process, or produce potentially explosive material (for example paint or sawdust);
- are intended for use in potentially explosive and/or flammable atmospheres;
- have special risks when producing or using certain materials;
- are intended for use in mines;
- are sewing machines, units, and systems (which are covered by GB 5226.4);
- are hoisting machines (which are covered by GB 5226.2).

Power circuits where electrical energy is directly used as a working tool are excluded from this part of GB 5226.

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 Rotating electrical machines - Rating and performance (GB 755-2008, IEC 60034-1:2004, IDT)

GB/T 4026-2004 Basic and safety principles for man-machine interface, marking and

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