



SLOVENSKI STANDARD SIST EN 60204-31:1999

01-julij-1999

BUXca Yý U
SIST EN 60204-3-1:1999

Safety of machinery - Electrical equipment of machines -- Part 31: Particular requirements for sewing machines, units and systems (IEC 60204-31:1998)

Safety of machinery - Electrical equipment of machines -- Part 31: Particular safety and EMC requirements for sewing machines, units and systems

Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen -- Teil 31: Besondere Sicherheits- und EMV-Anforderungen an Nähmaschinen, Näheinheiten und Nähanlagen

Sécurité des machines - Equipement électrique des machines -- Partie 31: Règles particulières de sécurité et de CEM pour machines à coudre, unités et systèmes de couture

Ta slovenski standard je istoveten z: EN 60204-31:1998

ICS:

13.110	Varnost strojev	Safety of machinery
61.080	Šivanje in druga oprema za oblačniški sektor	Sewing machines and other equipment for the clothing industry

SIST EN 60204-31:1999 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60204-31:1999

<https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999>

English version

Safety of machinery — Electrical equipment of machines — Part 31: Particular safety and EMC requirements for sewing machines, units and systems

(IEC 60204-31:1996, modified)

Sécurité des machines — Equipement
électrique des machines —
Partie 31: Règles particulières de sécurité et de
CEM pour machines à coudre, unités et
systèmes de couture
(CEI 60204-31:1996, modifiée)

Sicherheit von Maschinen — Elektrische
Ausrüstung von Maschinen —
Teil 31: Besondere Sicherheits — und EMK
Anforderungen an Nähmaschinen,
Näheinheiten und Nähanlagen (IEC 60204-
31:1996, modifiziert)

This European Standard was approved by CENELEC on 1998-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

(standards.iteh.ai)

SIST EN 60204-31:1999

<https://standards.iteh.ai/catalog/standards/sist/69a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999>

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Foreword

The text of the International Standard IEC 60204-31:1996, prepared by the Technical Committee IEC TC 44, Safety of machinery — Electrotechnical aspects, together with common modifications prepared by the Technical Committee CENELEC TC 44X, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60204-31 on 1998-08-01.

This European Standard supersedes EN 60204-3-1:1990.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1999-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-06-01

This part of EN 60204 is to be used in conjunction with EN 60204-1:1992, Safety of machinery — Electrical equipment of machines — Part 1: General requirements.

This part supplements or modifies the corresponding clauses in EN 60204-1 so as to convert it into the European Standard dealing with requirements for the electrical equipment of sewing machines, units and systems.

Where a particular subclause of part 1 is not mentioned in this part 31, that subclause applies as far as is reasonable. Where this part states “addition”, “modification” or “replacement”, the relevant text in part 1 is to be adapted accordingly.

Subclauses which are additional to those in part 1 are numbered from 101.

Annexes which are additional to those in part 1 are lettered AA, BB, etc. Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given for information only. In this standard, Annex AA and Annex ZA are normative and Annex BB is informative. Annex ZA has been added by CENELEC.

This part of EN 60204 fulfils safety objectives of the Low Voltage Directive (73/23/EEC) and the relevant electrotechnical Essential Requirements of the Machinery Directive (89/392/EEC) and the Essential Requirements of the EMC Directive (89/336/EEC).

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Definitions	3
4 General requirements	4
5 Incoming supply conductor terminations and devices for disconnecting and switching off	4
6 Protection against electric shock	5
7 Protection of equipment	5
8 Equipotential bonding	5
9 Control circuits and control functions	5
10 Operator interface and machine mounted control devices	7
11 Control interfaces	8
12 Electronic equipment	8
13 Controlgear: location, mounting and enclosures	8
14 Conductors and cables	8
15 Wiring practices	8
16 Electric motors and associated equipment	9
17 Accessories and lighting	9
18 Warning signs and item designations	9
19 Technical documentation	10
20 Testing	10
Annex AA (normative) Electromagnetic compatibility requirements	11
Annex BB (informative) Bibliography	17
Annex ZA (normative) Normative references to international publications with their corresponding European publications	19
Figure AA.1 — Standard sewing unit for EMC tests	13
Table AA.1 — Emission — Radiated (enclosure) and conducted (AC mains)	14
Table AA.2 — Immunity — Enclosure port	14
Table AA.3 — Immunity — Ports for signal lines and data buses not involved in process control, etc.	15
Table AA.4 — Immunity — Ports for process, measurement and control lines and long bus and control lines	15
Table AA.5 — Immunity — DC input and DC output power levels	16
Table AA.6 — Immunity — AC input and AC output power ports	16
Table AA.7 — Immunity — Earth port	16

1 Scope

This clause of part 1 is replaced by:

This part of IEC 204 applies to the application of electrical and electronic equipment to sewing machines, units and systems, designed specifically for professional use in the sewing industry.

NOTE See IEC 335-2-28 for requirements for sewing machines for household and similar use.

The equipment covered by this part commences at the point of connection of the supply to the electrical equipment of the machine. This part is applicable to equipment or parts of equipment which operate with nominal supply voltages not exceeding 1 000 V a.c. or 1 500 V d.c. between lines, and nominal frequencies not exceeding 200 Hz.

It does not cover all requirements (such as guarding, interlocking, control) which are necessary to safeguard persons from hazards other than electrical and which are specified in other standards.

This part applies to sewing units and systems which are installed in dry and well-kept clean locations and which process dry sewing material, as in the clothing industry. Where sewing units and systems are used in other than dry and well-kept clean locations, more stringent measures may be necessary, which need to be agreed.

2 Normative references

This clause of part 1 is applicable except as follows:

Additional references:

IEC 664-1:1992, *Insulation coordination for equipment within low voltage systems — Part 1: Principles, requirements and tests.*

IEC 721-3-3:1994, *Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 3: Stationary use at weather-protected locations.*

IEC 1000-4-2:1995, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 2: Electrostatic discharge immunity test. Basic EMC publication.*

IEC 1000-4-3:1995, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 3: Radiated, radio-frequency, electromagnetic field immunity test.*

IEC 1000-4-4:1995, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 4: Electrical fast transient/burst immunity test. Basic EMC publication.*

IEC 1058-1:1990, *Switches for appliances — Part 1: General requirements.*

ISO 4915:1991, *Textiles — Stitch types — Classification and terminology.*

ISO 4916:1991, *Textiles — Seam types — Classification and terminology.*

ISO/FDIS 7115, *Sewing machines — Vocabulary, classification and technical characteristics.*¹⁾

3 Definitions

This clause of part 1 is applicable except as follows:

Additional definitions:

3.101

sewing machine

machine designed to produce one or more stitch types (see ISO 4915) with one or more sewing threads (see 4.1 of ISO 7115). In producing a seam (see ISO 4916) the machine can perform one or more sewing functions

NOTE Previously, the term “sewing machine head” was used instead of “sewing machine”.

3.102

sewing machine stand

item, for example designed as a table, on which the sewing machine is arranged to enable optimum operation

¹⁾ At present at the stage of Final Draft International Standard.

3.103

sewing machine drive

equipment that drives a sewing machine, such as an electric motor, which is speed-controlled by electrical and/or mechanical means with or without a positioning device and with or without control of machine functions

3.104

sewing unit

equipment consisting of at least a sewing machine, a sewing machine stand and a sewing machine drive. One or several devices incorporated in and/or attached to the sewing machine or sewing unit, for example for sewing, cutting, feeding, etc. the sewing material, as well as the sewing machine itself, are controlled by the operator or automatically

3.105

sewing system

equipment consisting of at least two sewing units or parts of them, which are functionally interlinked

4 General requirements

This clause of part 1 is applicable except as follows:

4.4.1 Electromagnetic compatibility

See Annex AA.

4.4.3 Humidity

Modification:

Instead of the first paragraph, the following applies:

The electrical equipment shall be capable of operating in the intended manner in the humidity conditions covered by class 3K3 as specified in IEC 721-3-3.

5 Incoming supply conductor terminations and devices for disconnecting and switching off

This clause of part 1 is applicable except as follows:

5.1 Incoming supply conductor terminations

Modification:

Add after the first sentence of the first paragraph:

Each sewing unit shall have only one incoming supply connection.

Each sewing system consisting of at least two sewing units may have its own incoming supply connection for each sewing unit; however, if a failure of one sewing unit can cause a hazard, the sewing system shall have only one incoming supply connection.

Replacement of the first sentence of the third paragraph.

A neutral conductor may be used.

5.3 Supply disconnecting (isolating) device

SIST EN 60204-31:1999
<https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999>

5.3.1 General

Addition:

When sewing units are interconnected by means of control systems to form sewing systems, only one supply disconnecting device shall be provided.

5.3.2 Type

Addition to item d):

On sewing units and systems which are started and stopped by actuating a hold-to-run control device (e.g. pedal), an isolating switch according to IEC 947-3 for utilization categories AC-3 or DC-3, or a built-in switch according to IEC 1058-1, shall be used.

5.3.3 Requirements

5.3.3.1 General

Addition:

This implies that in the case of 5.3.2d), the requirements of 5.3.3.1 do not apply.

5.3.4 Operating handle

Addition:

For seated positions the operating handle of the ON/OFF switch shall be mounted between 0,5 m and 1,5 m above the servicing level.

6 Protection against electric shock

This clause of part 1 is applicable except as follows:

6.1 General

Addition:

This can be achieved also by the application of SELV according to IEC 364-4-41, particularly by the last paragraph of 411.1.4.3.

6.4 Protection by the use of PELV (Protective Extra-low Voltage)

Modification:

Item b) is not applicable.

7 Protection of equipment

This clause of part 1 is applicable except as follows:

7.5 Protection against supply interruption or voltage reduction and subsequent restoration

Addition:

On sewing units and systems, which are started by actuating a hold-to-run control device (such as a pedal), and stopped by releasing it, the provision of a device for avoiding an unintentional restart after a supply interruption or voltage reduction and subsequent restoration is not necessary.

8 Equipotential bonding

This clause of part 1 is applicable except as follows:

8.2.5 Parts which need not be connected to the protective bonding circuit

Addition:

It is not necessary to connect sewing machine stands or their accessible conducting parts when:

- they do not carry electrical equipment; or
- they carry electrical equipment operated at SELV and/or PELV only (see IEC 364-4-41).

9 Control circuits and control functions

This clause of part 1 is applicable except as follows:

9.1.1 Control circuit supply

Replacement:

Control circuits of sewing units and systems shall meet requirements for PELV (see 6.4) or SELV (see IEC 364-4-41). The transformers supplying these circuits shall meet the requirements of IEC 742.

9.1.4 Connection of control devices

Modification:

This subclause does not apply to controls of sewing machine drives with positioning devices.

9.2.5.2 Start

Addition:

The requirements of 9.2.5.2 do not apply to:

- sewing units and systems, which are started by actuating a hold-to-run control device (such as a pedal);
- sewing units and systems for automatic bar tacking, sewing of buttonholes, fastening of buttons, etc., which have a short sewing cycle.

9.2.5.3 Stop

Addition:

The STOP function required for sewing units and systems is met by a hold-to-run control device (such as a pedal). On sewing units and systems for automatic bar tacking, sewing of buttonholes, fastening of buttons, etc., which have a short sewing cycle, the required function is met by an ON/OFF switch according to IEC 947-3 or IEC 1058-1.

9.4 Control functions in case of failure

9.4.1 General requirements

Addition:

NOTE On sewing units and systems on which the hazardous movement of parts is limited to parts of the sewing machine itself, for example stitch forming elements, feed, etc., in general a single failure cannot give rise to hazardous conditions because of the mechanical guards. Therefore, for these machines, protective interlocking of the electrical circuit is not necessary.

9.4.2 Measures to minimize risk in case of failure

9.4.2.1 Use of proven circuit techniques and components

Modification:

At the end of the second dashed indent, replace "(see 9.1.4)" by the following:

NOTE See 9.1.4 of this part of IEC 204.

9.4.2.2 Provision for redundancy

Addition:

NOTE On sewing units and systems on which the hazardous movement of parts is limited to parts of the sewing machine itself, for example stitch forming elements, feed, etc., provision of redundancy is not necessary.

9.4.2.3 Use of diversity

Addition:

NOTE On sewing units and systems on which the hazardous movement of parts is limited to parts of the sewing machine itself, for example stitch forming elements, feed, etc., use of diversity is not necessary.

9.4.3.1 Earth faults

Addition:

On sewing units and systems, a particularly safe installation of those conductors that in the case of an earth fault could cause unintended starting, or hazardous movement of a machine, or could prevent its stopping, may be used instead of connecting the control circuits to the protective bonding circuit or providing an insulation monitoring device.

A particularly safe installation can be achieved, for example, by:

- enclosure of insulated conductors in ducts of insulating material;
- use of double insulation techniques; or
- encapsulation of components and devices.

10 Operator interface and machine mounted control devices

This clause of part 1 is applicable except as follows:

10.1.1 Location and mounting

Modification:

Replace the first dashed indent of the second paragraph by the following:

- those used for normal operation are not less than 0,6 m above the servicing level and are within easy reach from the normal working position of the operator (but see also 5.3.4 of this part);
- those used for adjustment and maintenance are not less than 0,3 m above the servicing level and so installed that they cannot be actuated during normal operation for example by position, locking, etc.

10.1.2 Protection

Replacement:

Where mounted as intended, operator interface and machine mounted control devices shall withstand the stresses of the expected use and shall have a minimum degree of protection of at least IP40 (see IEC 529). IP40 is considered to be sufficient since sewing units and sewing systems are operated in an environment in which the effects of aggressive fluids, vapours and contamination by coarse dust and chips are not to be expected.

10.2 Push-buttons

10.2.1 Colours

Modification:

Instead of the first paragraph the following applies:

As far as is practicable, push-button actuators shall be colour-coded in accordance with Table 2; limitations of the practicability are sizes of actuators and built-in casing, design of actuators.

10.3 Indicator lights and displays

10.3.2 Colours

Modification:

Instead of the first sentence the following applies:

As far as is practicable, indicator light lenses shall be colour-coded, with respect to the condition (status) of the machine in accordance with Table 3; limitations of the practicability are sizes of actuators and built-in casing, design of actuators.

10.4 Illuminated push-buttons

Modification:

Instead of the first sentence the following applies:

As far as is practicable, illuminated push-buttons shall be colour-coded in accordance with Table 2 and Table 3; limitations of the practicability are sizes of actuators and built-in casing, design of actuators.

10.7.5 Use of means of disconnection

Addition: [https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-](https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999)

[3f5aa8722d1b/sist-en-60204-31-1999](https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999)
On automatically controlled sewing units and systems for which emergency stop devices according to 10.7.2 are considered to be unnecessary, the supply disconnecting device shall fulfil the function of the emergency stop device (see also 5.3.3.1 of this part of IEC 204).

On sewing units and systems which are started by actuating a hold-to-run control device (such as a pedal), an emergency stop device is not required. Moreover, an emergency stop device is not necessary on automatically controlled sewing units and systems for automatic bar tacking, sewing of buttonholes, fastening of buttons, etc., which have only a short automatic sewing process.

These sewing units and systems may be equipped with a device according to IEC 947-3 or IEC 1058-1 for switching ON and OFF.

11 Control interfaces

This clause of part 1 is applicable except as follows:

11.1 General

Addition:

If a risk evaluation does not reveal the existence of a larger injury risk because, for instance, hazardous parts are protected by mechanical guards, the input or output circuits of sewing units and systems need not be, partly or completely, electrically isolated from internal circuits of the numerical control or from the programmable control unit, and the control voltages need not be earthed.

11.2 Digital input/output interfaces

11.2.2 Outputs

Modification:

The first paragraph is not applicable.

12 Electronic equipment

This clause of part 1 is applicable.

13 Controlgear: location, mounting and enclosures

This clause of part 1 is applicable except as follows:

13.2 Location and mounting

13.2.1 Accessibility and maintenance

Modification:

Instead of the second paragraph the following applies:

Where access is required for regular maintenance or adjustment, the relevant devices shall be arranged between 0,3 m and 2,0 m above the servicing level.

13.2.2 Segregation

Addition:

In enclosures according to 6.2.1, the distances between the protective enclosure and live parts shall be not less than the clearance and creepage distances given in column L-L of Table C.1 of IEC 947-4-1.

For printed circuit assemblies and all other electrical equipment and devices (such as switches, motors), IEC 664-1, Table 4, pollution degree 2 shall apply.

13.3 Degrees of protection

Replacement:

The minimum degree of protection is IP40 for enclosures of switching devices of sewing units and systems. However, if all the circuits used in and with the devices meet the requirements of 6.1 of this part of IEC 204, IP20 is permitted as the minimum degree of protection.

14 Conductors and cables

This clause of part 1 is applicable.

15 Wiring practices

This clause of part 1 is applicable except as follows:

15.2.4 Identification of other conductors

Addition:

Conductors used for functional earthing shall be identified by the colour GREY.

Common conductors, for example for eliminating static charges, shall be identified by the colour GREY.

iTeh STANDARD PREVIEW

(standards.iteh.ai)

[SIST EN 60204-31:1999](https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999)

[https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-](https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999)

[3f5aa8722d1b/sist-en-60204-31-1999](https://standards.iteh.ai/catalog/standards/sist/ea63d321-83a7-48b7-9224-3f5aa8722d1b/sist-en-60204-31-1999)

15.5.8 Terminals, connection and junction boxes

Modification:

Instead of the second sentence of the first paragraph the following applies:

IP40 (see IEC 529) is the minimum degree of protection for connection and through boxes of sewing units and systems. However, if all the circuits used in and with the devices meet the requirements of 6.1 of this part of IEC 204, IP20 is permitted as the minimum degree of protection.

16 Electric motors and associated equipment

This clause of part 1 is applicable except as follows:

16.1 General requirements

Addition:

Voltage transformation for the purpose of feeding external consumers (loads) by tapping the stator winding of motors is not permitted.

16.2 Motor enclosures

Addition:

The minimum degree of protection of the sewing machine drive (including the control device possibly attached to it) shall be IP40.

16.3 Motor dimensions

Addition:

The dimensions of sewing machine drives need not correspond to IEC 72-1 and IEC 72-2.

17 Accessories and lighting

This clause of part 1 is applicable except as follows:

17.2 Local lighting of the machine and equipment

17.2.1 General

Addition:

For local lighting (sewing lamps) of sewing units and systems up to a rated voltage of 50 V a.c., the ON/OFF switch may be incorporated in the flexible connecting cords.

17.2.2 Supply

Addition:

Low-voltage sewing lamps shall be supplied either by built-in transformers or by external extra-low voltage transformers according to IEC 742.

Circuits for local lighting (sewing lamps) intended for use for, for example threading, replacing sewing implements, maintenance work, shall be connected to the incoming supply side of the device for switching ON and OFF the sewing unit or system.

18 Warning signs and item designations

This clause of part 1 is applicable.