

<b>STN</b>	<b>Zostavy dosiek s plošnými spojmi</b> <b>Časť 4: Čiastočná špecifikácia</b> <b>Požiadavky na zostavy spájkované na</b> <b>zakončovacie kolíky</b>	<b>STN</b> <b>EN 61191-4</b>  35 9041
------------	--	--

Printed board assemblies - Part 4: Sectional specification - Requirements for terminal soldered assemblies

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/18

Obsahuje: EN 61191-4:2017, IEC 61191-4:2017

Oznámením tejto normy sa od 30.08.2020 ruší  
STN EN 61191-4 (35 9041) z júla 2001

**127163**

EUROPEAN STANDARD

**EN 61191-4**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2017

ICS 31.240

Supersedes EN 61191-4:1998

English Version

Printed board assemblies - Part 4: Sectional specification -  
Requirements for terminal soldered assemblies  
(IEC 61191-4:2017)

Ensembles de cartes imprimées - Partie 4: Spécification  
intermédiaire - Exigences pour les assemblages soudés  
des terminaux  
(IEC 61191-4:2017)

Elektronikaufbauten auf Leiterplatten - Teil 4:  
Rahmenspezifikation - Anforderungen an gelötete  
Baugruppen mit Lötstützpunkten  
(IEC 61191-4:2017)

This European Standard was approved by CENELEC on 2017-08-30. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**EN 61191-4:2017****European foreword**

The text of document 91/1399/CDV, future edition 2 of IEC 61191-4, prepared by IEC/TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61191-4:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-05-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-08-30

This document supersedes EN 61191-4:1998.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

**Endorsement notice**

The text of the International Standard IEC 61191-4:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-20:2008	NOTE	Harmonized as EN 60068-20:2008 (not modified).
IEC 60068-2-58:2015	NOTE	Harmonized as EN 60068-2-58:2015 (not modified).
IEC 61188-5-1:2002	NOTE	Harmonized as EN 61188-5-1:2002 (not modified).
IEC 61188-5-2:2003	NOTE	Harmonized as EN 61188-5-2:2003 (not modified).
IEC 61188-5-3:2007	NOTE	Harmonized as EN 61188-5-3:2007 (not modified).
IEC 61188-5-4:2007	NOTE	Harmonized as EN 61188-5-4:2007 (not modified).
IEC 61188-5-5:2007	NOTE	Harmonized as EN 61188-5-5:2007 (not modified).
IEC 61188-5-6:2003	NOTE	Harmonized as EN 61188-5-6:2003 (not modified).
IEC 61188-7:2017	NOTE	Harmonized as EN 61188-7:2017 (not modified).
IEC 61189-2:2006	NOTE	Harmonized as EN 61189-2:2006 (not modified).
IEC 61190-1-2:2014	NOTE	Harmonized as EN 61190-1-2:2014 (not modified).
IEC 61193-1:2001	NOTE	Harmonized as EN 61193-1:2002 (not modified).
IEC 61193-3	NOTE	Harmonized as EN 61193-3.
IEC 62326-1:2002	NOTE	Harmonized as EN 62326-1:2002 (not modified).
IEC 62326-4:1996	NOTE	Harmonized as EN 62326-4:1997 (not modified).
IEC 62326-4-1:1996	NOTE	Harmonized as EN 62326-4-1:1997 (not modified).
ISO 9001:2015	NOTE	Harmonized as EN ISO 9001:2015 (not modified).

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60194	-	Printed board design, manufacture and assembly - Terms and definitions	-	-
IEC 61191-1	2013	Printed board assemblies - Part 1: Generic specification - Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies	EN 61191-1	2013



IEC 61191-4

Edition 3.0 2017-07

# INTERNATIONAL STANDARD

---

**Printed board assemblies –  
Part 4: Sectional specification – Requirements for terminal soldered assemblies**



**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2017 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

**IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

**IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [csc@iec.ch](mailto:csc@iec.ch).



IEC 61191-4

Edition 2.0 2017-07

# INTERNATIONAL STANDARD

---

**Printed board assemblies –  
Part 4: Sectional specification – Requirements for terminal soldered assemblies**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 31.240

ISBN 978-2-8322-4657-3

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions .....	6
4 General requirements .....	6
5 General terminal and part mounting requirements.....	6
5.1 General.....	6
5.2 Wire and cable preparation .....	7
5.2.1 General .....	7
5.2.2 Tinning of stranded wire .....	7
5.3 Terminal installation.....	7
5.3.1 General .....	7
5.3.2 Terminal mounting (mechanical).....	7
5.3.3 Terminal shank discontinuities.....	8
5.3.4 Flange discontinuities .....	8
5.3.5 Terminal mounting (electrical).....	8
5.3.6 Flange angles.....	9
5.3.7 Shank discontinuities .....	9
5.3.8 Flared flange discontinuities .....	9
5.4 Mounting to terminals.....	10
5.4.1 General .....	10
5.4.2 Wire and lead wrap-around.....	10
5.4.3 Side route connection.....	10
5.4.4 Top and bottom route connection.....	11
5.4.5 Continuous runs .....	12
5.4.6 Service loops.....	13
5.4.7 Insulation clearance.....	13
5.4.8 Orientation of wire wrap.....	14
5.4.9 Stress relief.....	14
5.4.10 Pierced or perforated terminals.....	14
5.4.11 Cup and hollow cylindrical terminal soldering.....	15
6 Acceptance requirements .....	16
6.1 General.....	16
6.2 Control and corrective actions.....	16
6.3 Terminal soldering .....	16
6.3.1 General .....	16
6.3.2 Wire-terminal attachment.....	16
6.4 Part marking and reference designations .....	16
7 Rework of unsatisfactory soldered connections.....	16
Bibliography.....	18
Figure 1 – Rolled flange terminal .....	8
Figure 2 – Rolled flange discontinuities.....	8
Figure 3 – Flared flange terminals.....	9
Figure 4 – Flared angles .....	9



Figure 5 – Wire and lead wrap around .....	10
Figure 6 – Side route connections and wrap on bifurcated terminal .....	11
Figure 7 – Top and bottom route terminal connection .....	12
Figure 8 – Continuous run wire wraps .....	13
Figure 9 – Service loop for lead wiring .....	13
Figure 10 – Insulation clearance measurement ( <i>c</i> ) .....	14
Figure 11 – Stress relief examples .....	14
Figure 12 – Pierced or perforated terminal wire wrap .....	15
Table 1 – Nicked or broken strand limits .....	7
Table 2 – Plated through-holes with terminals, minimum acceptance conditions .....	16
Table 3 – Defects for terminal attachment and soldering defects .....	17

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PRINTED BOARD ASSEMBLIES –****Part 4: Sectional specification –  
Requirements for terminal soldered assemblies**

## 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61191-4 has been prepared by IEC technical committee 91: Electronics assembly technology.

This second edition cancels and replaces the first edition published in 1998. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- The requirements have been updated to be compliant with the acceptance criteria in IPC-A-610F.

The text of this International Standard is based on the following documents:

CDV	Report on voting
91/1399/CDV	91/1434/RVC

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

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

A list of all parts in the IEC 61191 series, published under the general title *Printed board assemblies*, can be found on the IEC website.

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

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

A bilingual version of this publication may be issued at a later date.

## PRINTED BOARD ASSEMBLIES –

### Part 4: Sectional specification – Requirements for terminal soldered assemblies

#### 1 Scope

This part of IEC 61191 prescribes requirements for terminal soldered assemblies. The requirements pertain to those assemblies that are entirely terminal/wire interconnecting structures or to the terminal/wire portions of those assemblies that include other related technologies (i.e. surface mounting, through-hole mounting, chip mounting).

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60194, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 61191-1:2013, *Printed board assemblies – Part 1: Generic specification – Requirements for soldered electrical and electronic assemblies using surface mount and related assembly technologies*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**