

**INTERNATIONAL
STANDARD**

**IEC
60297-5-104**

First edition
2001-01

**Mechanical structures for electronic equipment –
Dimensions of mechanical structures
of the 482,6 mm (19 in) series –**

**Part 5-104:
Subracks and associated plug-in units –
Keying**

*Structures mécaniques pour équipement électronique –
Dimensions des structures mécaniques de la série
de 482,6 mm (19 in) –*

*Partie 5-104:
Bacs et blocs enfichables associés –
Codage*



Reference number
IEC 60297-5-104:2001(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site (www.iec.ch)**

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (www.iec.ch/catalogue.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications (www.iec.ch/JIP.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: custserv@iec.ch
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

**INTERNATIONAL
STANDARD**

**IEC
60297-5-104**

First edition
2001-01

**Mechanical structures for electronic equipment –
Dimensions of mechanical structures
of the 482,6 mm (19 in) series –**

**Part 5-104:
Subracks and associated plug-in units –
Keying**

*Structures mécaniques pour équipement électronique –
Dimensions des structures mécaniques de la série
de 482,6 mm (19 in) –*

*Partie 5-104:
Bacs et blocs enfichables associés –
Codage*

© IEC 2001 — Copyright - all rights reserved

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 the publisher.

International Electrotechnical Commission 3, rue de Varembe, Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site: <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE **H**

For price, see current catalogue

CONTENTS

	Page
FOREWORD	3
INTRODUCTION	5
 Clause	
1 Scope and object	6
2 Normative references	6
3 Definitions	7
4 Extended feature added to IEC 60297-3 and IEC 60297-4	7
5 General equipment arrangement	8
6 Detail equipment arrangement	9
7 Keying of plug-in units in a subrack	10
7.1 Subrack guide rail dimensions for the keying of box and printed board type plug-in units with front panels	10
7.2 Subrack guide rail dimensions for the keying of box and printed board type plug-in units \geq 2HP with front panels	12
7.3 Guide rail dimensions for the keying of board type plug-in units \geq 3HP	12
7.4 Programmable key dimensions	13
7.5 Programming of keys	14
7.6 Keying chamber inspection dimensions	15
Figure 1 – General equipment arrangement – Typical 5U subrack with front and/or rear mounted plug-in units featured with keying	8
Figure 2 – Design detail equipment arrangement	9
Figure 3a – Subrack guide rail dimensions for the keying of box and printed board type plug-in units	10
Figure 3b – Subrack guide rail mounted key dimension for the keying of box and printed board type plug-in units	11
Figure 4 – Plug-in unit dimensions for the programmable keying of box and printed board type plug-in units	11
Figure 5 – Subrack guide rail dimensions for the keying of box and printed board type plug-in units \geq 2HP	12
Figure 6 – Guide rail dimensions for the keying of printed board type plug-in units \geq 3HP	12
Figure 7 – Programmable key dimensions	13
Figure 8 – Programming of keys	14
Figure 9 – Front and/or rear subrack and plug-in unit keying chamber inspection dimensions	15
Table 1 – Subrack and plug-in unit keying chamber inspection dimensions	15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT –
DIMENSIONS OF MECHANICAL STRUCTURES
OF THE 482,6 mm (19 in) SERIES –**

**Part 5-104: Subracks and associated plug-in units –
Keying**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60297-5-104 has been prepared by subcommittee 48D: Mechanical structures for electronic equipment, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
48D/242/FDIS	48D/251/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 3.

IEC 60297-5 consists of the following parts under the general title: Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series:

Part 5-100, Subracks and associated plug-in units – Design overview

Part 5-101, Subracks and associated plug-in units – Injector/extractor handle

Part 5-102, Subracks and associated plug-in units – Electromagnetic shielding provision

Part 5-103, Subracks and associated plug-in units – Electrostatic discharge protection

Part 5-104, Subracks and associated plug-in units – Keying

Part 5-105, Subracks and associated plug-in units – Alignment and/or earth pin

Part 5-107, Subracks and associated plug-in units – Rear mounted plug-in units

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

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

INTRODUCTION

This part of IEC 60297 is based on IEC 60297-3 (1984), Its Amendment 1 (1992), and IEC 60297-4 (1995). It contains detail dimensions which ensure dimensional interchangeability of subracks, plug-in units and keys where board type plug-in units requiring an accessible method of keying for subrack front and/or rear mounted plug-in units.

This standard applies only to the mechanical structures for electronic equipment practices according to the IEC 60297 series.

**MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT –
DIMENSIONS OF MECHANICAL STRUCTURES
OF THE 482,6 mm (19 in) SERIES –**

**Part 5-104: Subracks and associated plug-in units –
Keying**

1 Scope and object

This part of IEC 60297 covers extended features of a retained keying method added to subracks and plug-in units with front panels according to IEC 60297-3, IEC 60297-4 and IEC 60297-5-107. By implementing this extended feature to the subracks and plug-in units, a new subrack and plug-in unit type (incompatible with IEC 60297-3 and IEC 60297-4) is created.

The purpose of this standard is to specify dimensions which will ensure dimensional interchangeability of subracks and associated plug-in units using the extended feature of a retained keying method added to IEC 60297-3, IEC 60297-4 and IEC 60297-5-107.

For mechanical and climatic tests refer to IEC 61587-1.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60297. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60297 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60297-3, *Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 3: Subracks and associated plug-in units*

IEC 60297-4, *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 4: Subracks and associated plug-in units – Additional dimensions¹*

IEC 60297-5-100, *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 5-100: Subracks and associated plug-in units – Design overview*

IEC 60297-5-107, *Mechanical structures for electronic equipment – Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 5-107: Subracks and associated plug-in units – Rear mounted plug-in units*

IEC 60917-1, *Modular order for the development of mechanical structures for electronic equipment practices – Part 1: Generic standard*

IEC 61587-1, *Mechanical structures for electronic equipment – Tests for IEC 60917 and IEC 60297 – Part 1: Climatic, mechanical tests and safety aspects for cabinets, racks, subracks and chassis*

¹ There is a consolidated edition 1.1 (1999) that includes IEC 60297-4 (1995) and its amendment 1 (1999).

3 Definitions

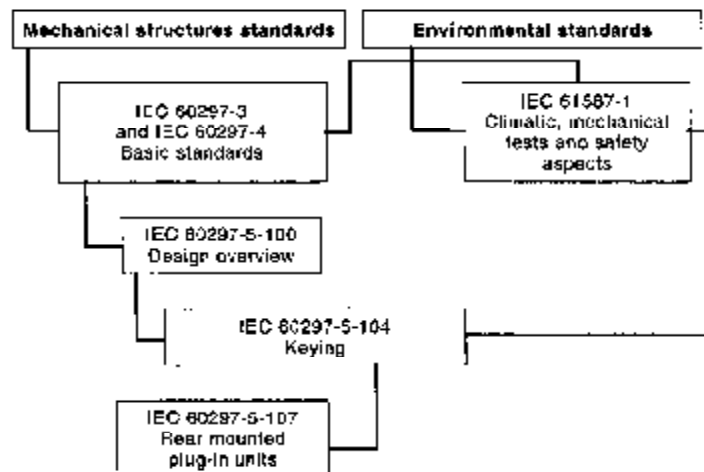
For the purpose of this part of IEC 60297, the definitions of IEC 60917-1 apply.

4 Extended feature added to IEC 60297-3 and IEC 60297-4

This standard gives dimensions only where they differ from or supplement those to be found in IEC 60297-3 and 60297-4. The dimensions used in this standard shall take precedence over those of IEC 60297-3 and 60297-4 when conformance to this standard is claimed. Dimensions shown in brackets are for reference only and are found in the stated standards.

The drawings in this standard are not intended to indicate product design.

Extended feature	Basic standards	Extended standards	Environmental standards
Keying	IEC 60297-3 IEC 60297-4	IEC 60297-5-104 IEC 60297-5-107	IEC 61587-1



5 General equipment arrangement

Generally, these are subracks featuring front and/or rear subrack mounted plug-in units with keying.

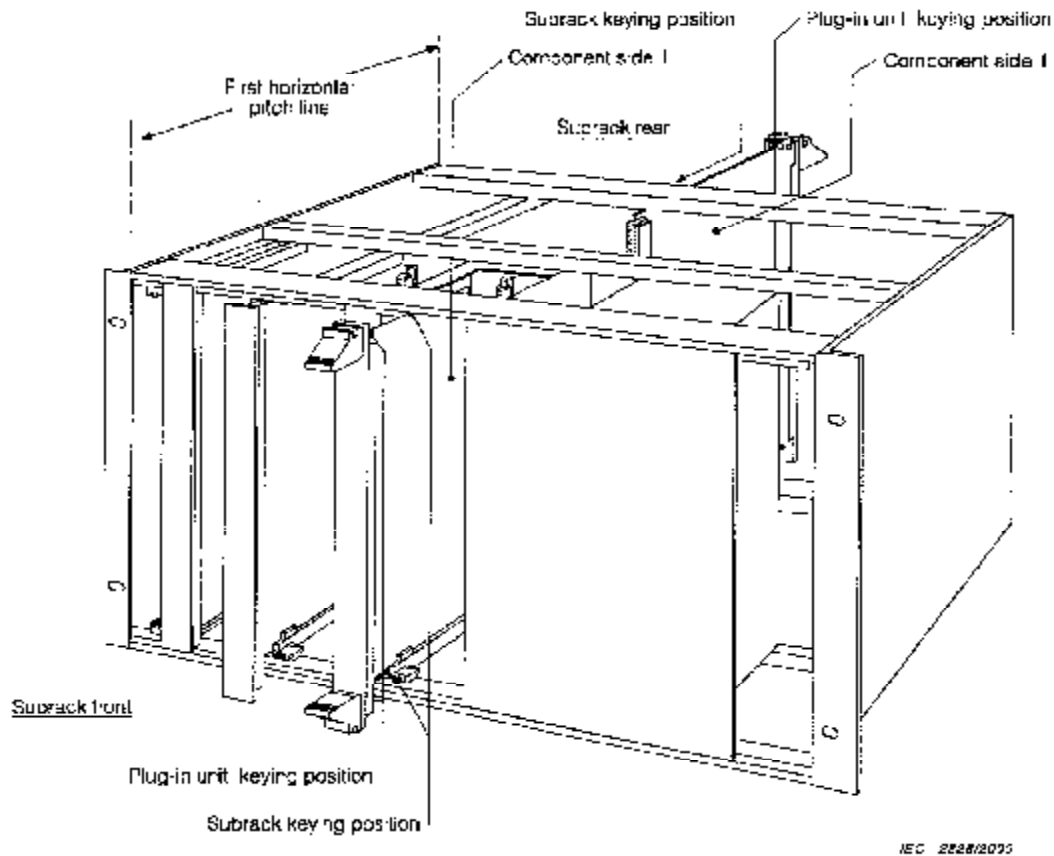


Figure 1 – General equipment arrangement – Typical 6U subrack with front and/or rear mounted plug-in units featured with keying

6 Detail equipment arrangement

The detail arrangement below points out the added keying feature of this standard.

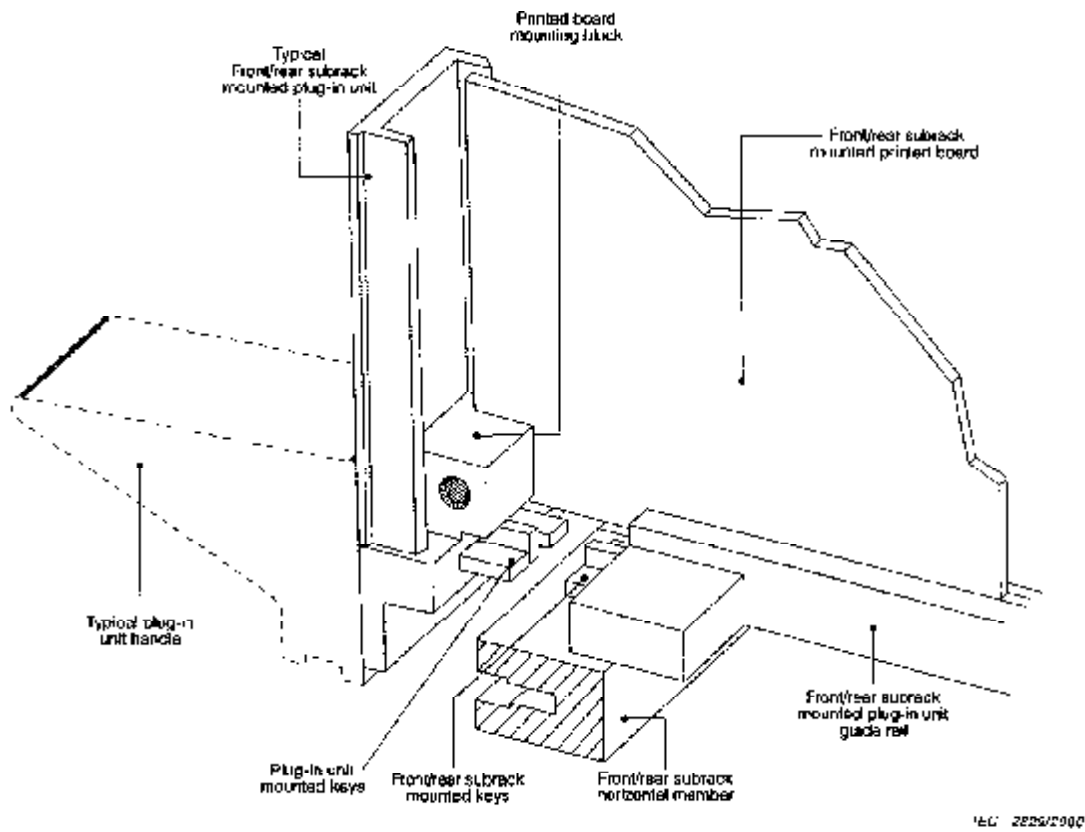


Figure 2 – Design detail equipment arrangement

7 Keying of plug-in units in a subrack

Applications require functional plug-in units to be assigned to specific subrack guide positions. Plugging the wrong plug-in unit into the wrong position may cause the system to malfunction. Therefore the need for keying is essential to ensure the correct functioning of systems.

This standard details a keying system that is user programmable from the front and/or rear of a subrack and on the rear face of a plug-in unit. The programmable key can be set, removed or changed by the user.

A subrack assembled with guide rails in accordance with IEC 60297-3, IEC 60297-4 and IEC 60297-5-107 (without a keying feature) will accept plug-in units with front panels in accordance with this standard (with keys removed).

7.1 Subrack guide rail dimensions for the keying of box and printed board type plug-in units with front panels

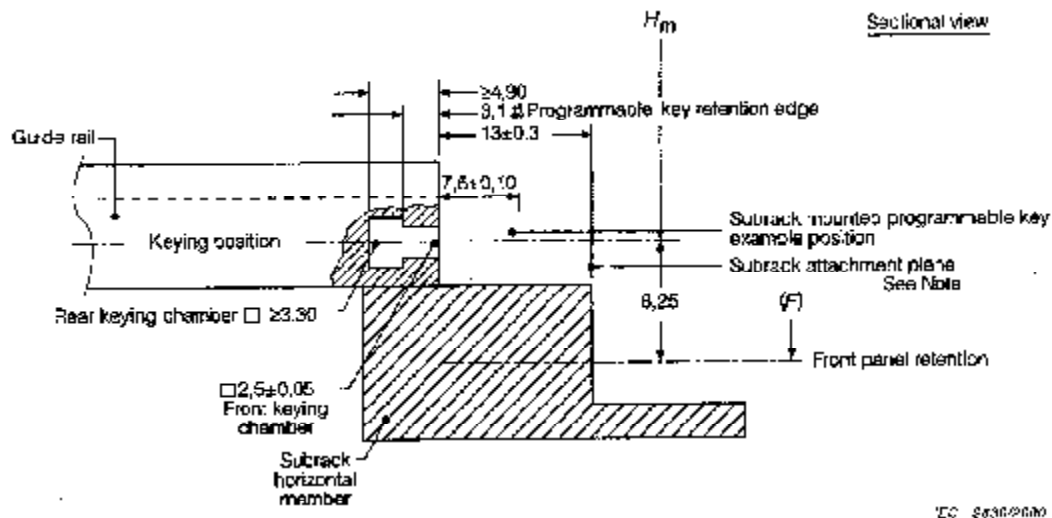
Board type plug-in units are defined in IEC 60297-3 and IEC 60297-4.

Box type plug-in units are defined in IEC 60297-3.

Subrack rear mounting of plug-in units are defined in IEC 60297-5-107.

H_m is the centre line for the keying position in the upper and lower subrack guide rail. See table 1.

() See IEC 60297-3 and IEC 60297-4.

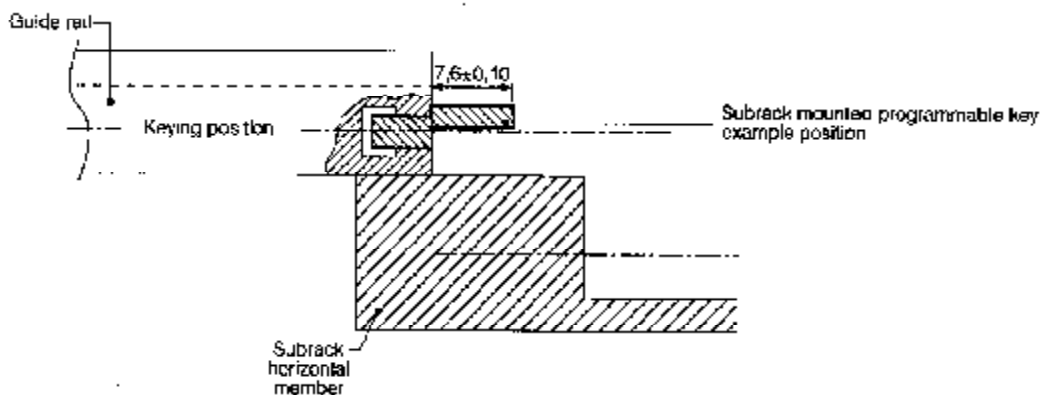


Dimensions in millimetres

NOTE The subrack attachment plane (front/rear) is used to attach (front/rear) subrack mounted plug-in unit front panels.

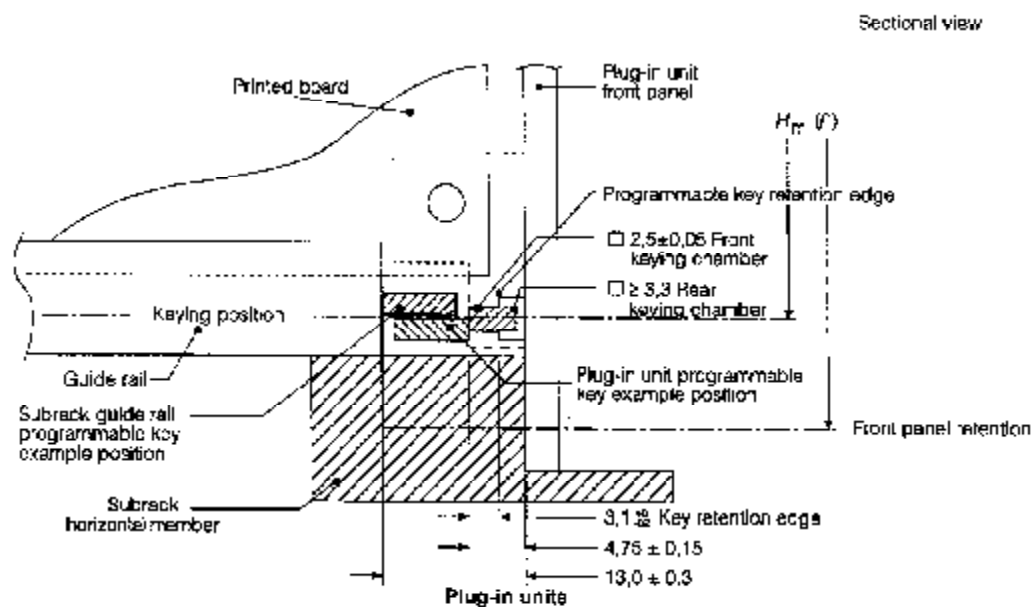
Figure 3a – Subrack guide rail dimensions for the keying of box and printed board type plug-in units

() See IEC 60297-3 and IEC 60297-4.



Dimensions in millimetres

Figure 3b – Subrack guide rail mounted key dimension for the keying of box and printed board type plug-in units

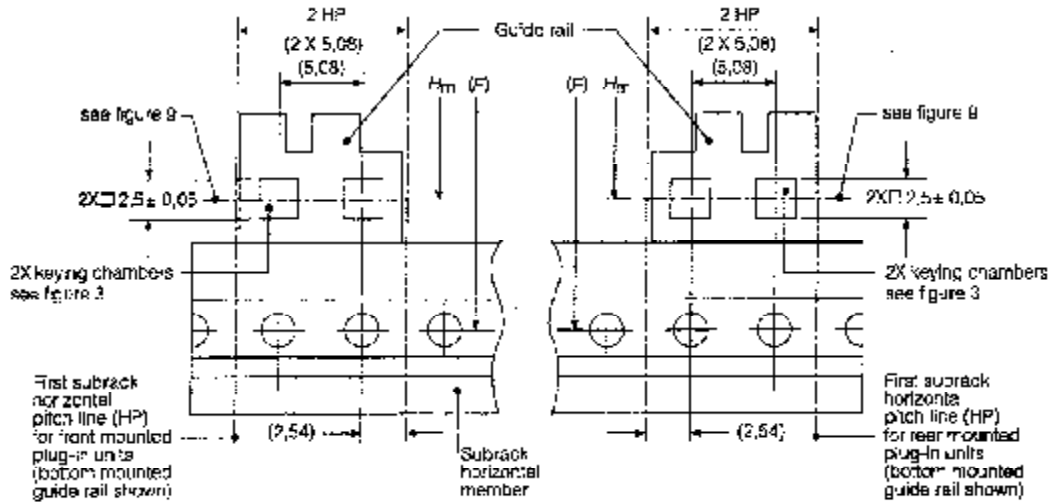


Dimensions in millimetres

Figure 4 – Plug-in unit dimensions for the programmable keying of box and printed board type plug-in units

7.2 Subrack guide rail dimensions for the keying of box and printed board type plug-in units \geq 2HP with front panels

() See IEC 60297-3 and IEC 60297-4.



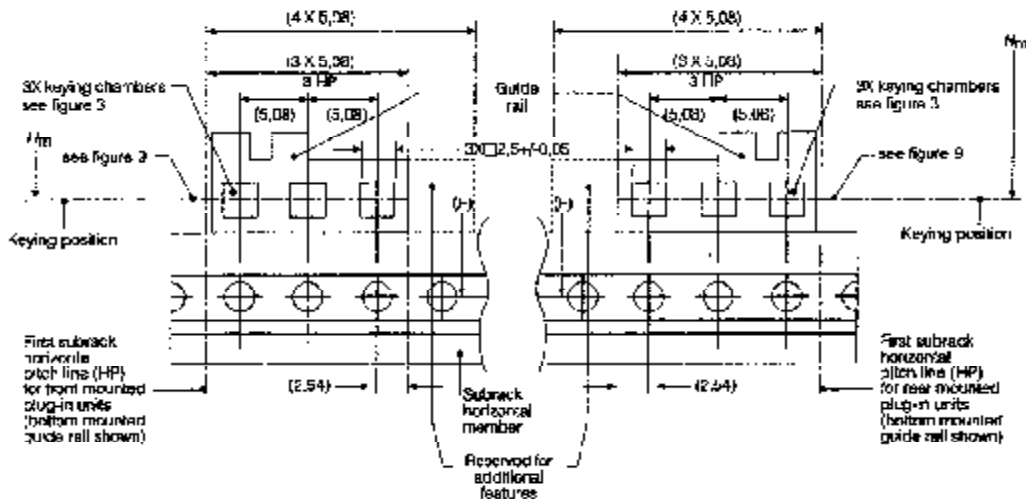
IEC 2E33:2006

Dimensions in millimetres

Figure 5 – Subrack guide rail dimensions for the keying of box and printed board type plug-in units \geq 2HP

7.3 Guide rail dimensions for the keying of board type plug-in units \geq 3HP

() See IEC 60297-3 and IEC 60297-4.



NOTE Not suitable for box type plug-in units

IEC 2E34:2006

Dimensions in millimetres

Figure 6 – Guide rail dimensions for the keying of printed board type plug-in units \geq 3HP

7.5 Programming of keys

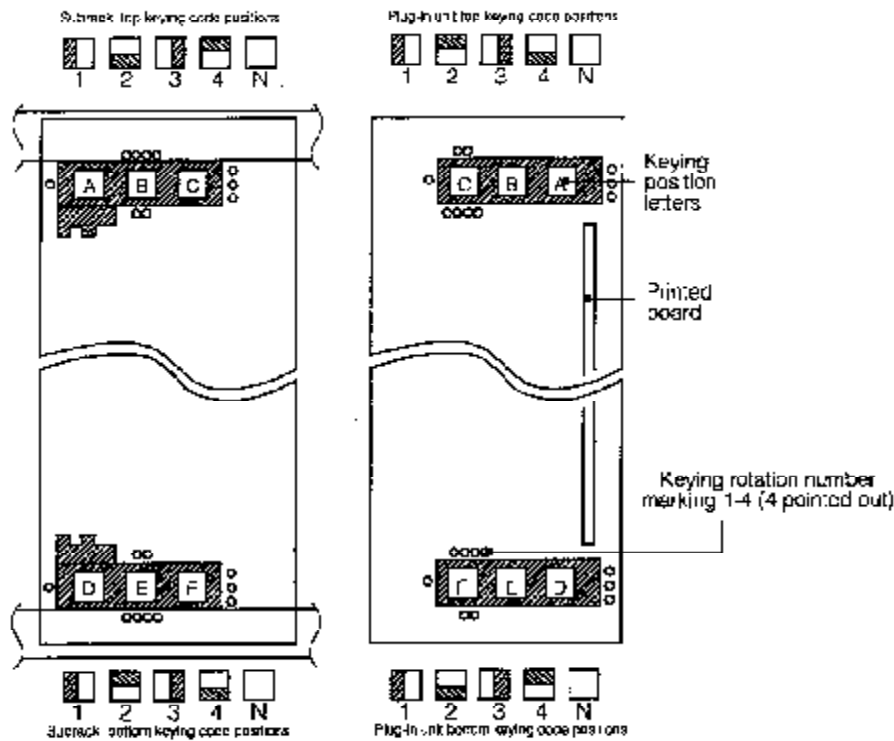
Programmable keying defines a standardized designation of keying combinations.

The key provides for four keying positions in a single keying chamber. All keying chambers are defined by letters and by key rotation number marking 1 to 4.

Figure 8 shows keying on the front of the subrack with front mounted plug-in units. If the keying is also used at the rear of the subrack with rear mounted plug-in units per IEC 60297-5-107, the letters are upside down.

Typically, in 3U subracks equipped with plug-in units for 3U subracks, keying is used on the bottom only.

- Chambers D E F at the front of the subrack. Chambers A B C on the rear of the subrack (see IEC 60297-5-107).
- Typically, in 6U and 9U subracks equipped with plug-in units for 6U and 9U subracks, keying is used at the bottom and the top. Chambers A B C D E F at the front and/or the rear (see IEC 60297-5-107) of the subrack. On the rear of the subrack the letters ABC will be found at the bottom of the subrack/plug-in unit.



IEC 2835:2006

N No key in keying chamber

Figure 8 – Programming of keys

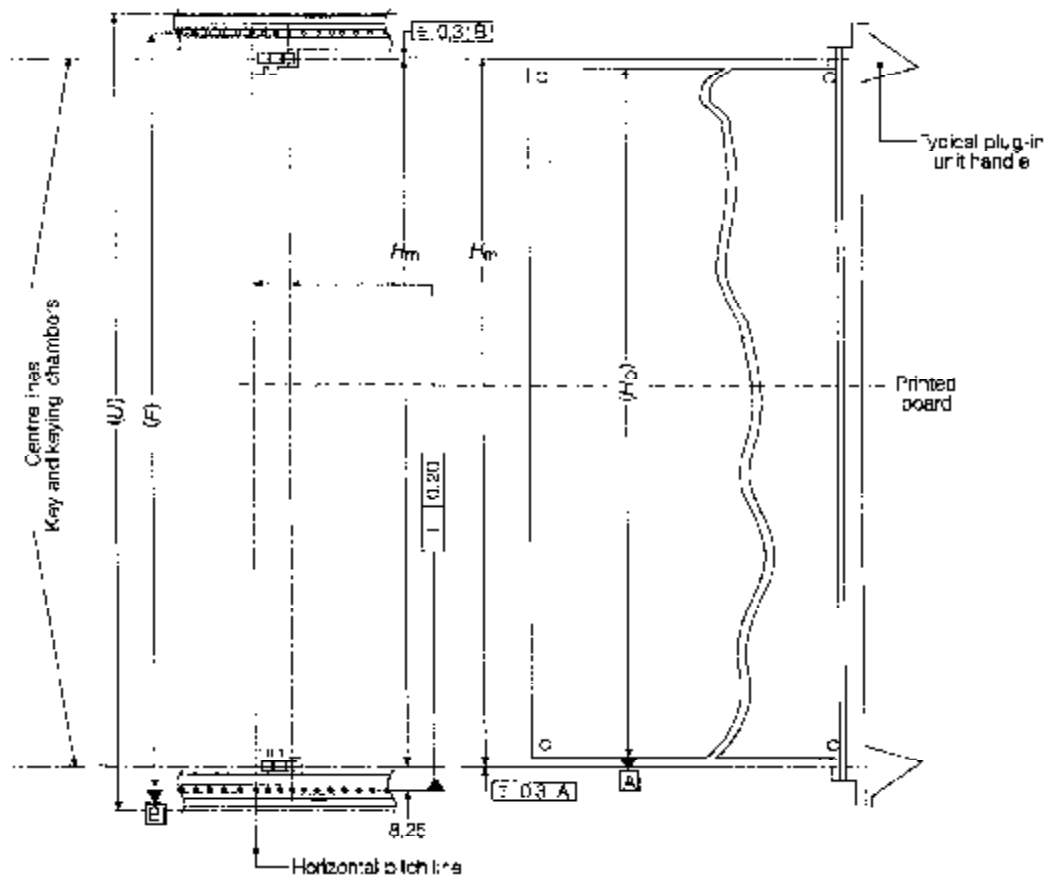
7.6 Keying chamber inspection dimensions

Table 1 – Subrack and plug-in unit keying chamber inspection dimensions

Dimensions in millimetres

(U)	3	6	9
$H_m \pm 0,3$	108,00	239,35	372,70

() See IEC 60297-3 and IEC 60297-4.



IEC 287/2960

Dimensions in millimetres

Figure 9 – Front and/or rear subrack and plug-in unit keying chamber inspection dimensions



Standards Survey

The IEC would like to offer you the best quality standards possible. To make sure that we continue to meet your needs, your feedback is essential. Would you please take a minute to answer the questions overleaf and fax them to us at +41 22 919 03 00 or mail them to the address below. Thank you!

Customer Service Centre (CSC)

International Electrotechnical Commission

3, rue de Varembe

1211 Genève 20

Switzerland

or

Fax to: IEC/CSC at +41 22 919 03 00

Thank you for your contribution to the standards-making process.

A Prioritaire

Nicht frankieren
Ne pas affranchir



Non affrancare
No stamp required

RÉPONSE PAYÉE

SUISSE

Customer Service Centre (CSC)

International Electrotechnical Commission

3, rue de Varembe

1211 GENEVA 20

Switzerland



Q1 Please report on **ONE STANDARD** and **ONE STANDARD ONLY**. Enter the exact number of the standard: (e.g. 60601-1-1)

.....

Q2 Please tell us in what capacity(ies) you bought the standard (tick all that apply). I am the/a:

- purchasing agent
- librarian
- researcher
- design engineer
- safety engineer
- testing engineer
- marketing specialist
- other.....

Q3 I work for/in/as at: (tick all that apply)

- manufacturing
- consultant
- government
- test/certification facility
- public utility
- education
- military
- other.....

Q4 This standard will be used for: (tick all that apply)

- general reference
- product research
- product design/development
- specifications
- tenders
- quality assessment
- certification
- technical documentation
- thesis
- manufacturing
- other.....

Q5 This standard meets my needs: (tick one)

- not at all
- nearly
- fairly well
- exactly

Q6 If you ticked NOT AT ALL in Question 5 the reason is: (tick all that apply)

- standard is out of date
- standard is incomplete
- standard is too academic
- standard is too superficial
- title is misleading
- I made the wrong choice
- other.....

Q7 Please assess the standard in the following categories, using the numbers:

- (1) unacceptable,
- (2) below average,
- (3) average,
- (4) above average,
- (5) exceptional,
- (6) not applicable

- timeliness.....
- quality of writing.....
- technical contents.....
- logic of arrangement of contents.....
- tables, charts, graphs, figures.....
- other.....

Q8 I read/use the: (tick one)

- French text only
- English text only
- both English and French texts

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

.....



ISBN 2-8318-5580-0



9 782831 855813

ICS 31.240

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND