

INTERNATIONAL STANDARD

IEC 61082-1

Second edition
2006-04

Preparation of documents used in electrotechnology –

Part 1: Rules

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number
IEC 61082-1:2006(E)

INTERNATIONAL STANDARD

IEC 61082-1

Second edition
2006-04

Preparation of documents used in electrotechnology –

Part 1: Rules

Withdrawn

© IEC 2006 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, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE **XE**

For price, see current catalogue

CONTENTS

FOREWORD.....	13
INTRODUCTION.....	17
1 Scope.....	19
2 Normative references	19
3 Terms and definitions	23
3.1 Basic terms	23
3.2 Terms related to the forms of presentation of information	25
3.3 Terms related to basic document kinds.....	27
3.4 Terms related to specific document kinds	27
4 Documentation principles	29
4.1 General considerations.....	29
4.2 Structure of documentation.....	29
4.3 Presentation of information.....	31
4.4 Document identification and designation	33
5 Rules for presentation of information	33
5.1 Legibility.....	33
5.2 Text orientation	35
5.3 Colours, shading and patterns.....	35
5.4 Paper page sizes.....	37
5.5 Paper page reproduction.....	37
5.6 Page identification.....	37
5.7 Page layout	39
5.8 Cross-references.....	47
5.9 Hyperlinks.....	49
5.10 Line widths.....	49
5.11 Text fonts	49
5.12 Symbols.....	51
5.13 Scales.....	55
5.14 Pictorial presentation.....	55
5.15 Quantities, units, values and colour codes.....	55
5.16 Presentation of ranges and set of elements.....	55
5.17 Dimension lines.....	59
5.18 Leader lines and reference lines.....	59
5.19 Explanatory notes and markings.....	61
5.20 Reference designations	61
5.21 Terminal designations	65
5.22 Signal designations	65
6 Document kinds.....	65
7 Diagrams.....	67
7.1 General	67
7.2 Overview diagrams.....	99
7.3 Function diagrams.....	107
7.4 Circuit diagrams	109
7.5 Connection diagrams.....	131

8	Drawings	141
8.1	General	141
8.2	Requirements on base documents	141
8.3	Arrangement drawings	147
9	Tables	155
9.1	General	155
9.2	Presentation of reference designations	155
9.3	Connection tables	157
10	Charts, graphs	159
10.1	General	159
10.2	Function charts	161
10.3	Sequence charts and time sequence charts	161
11	Structured documentation	163
11.1	General	163
11.2	Presentation of occurrences of an object type in diagrams	163
11.3	Referencing	169
11.4	Document metadata	173
12	CAX conformance requirements	175
	Annex A (normative) Construction of a symbol for an object which does not have a symbol in IEC 60617	177
	Annex B (informative) Document management information and title blocks	193
	Annex C (informative) Document kind designations and content of information	199
	Bibliography	209
	Figure 1 – Documents generated from information stored in a database	31
	Figure 2 – Documents prepared and stored in a database	33
	Figure 3 – Viewing directions of a document	35
	Figure 4 – Examples of a documents with document and page identifications	37
	Figure 5 – Example of documents with multiple document identifiers	39
	Figure 6 – Examples of pages with defined identification areas	41
	Figure 7 – Example of a reference grid (Page A3 landscape, module size 2,5 mm, reference grid 16 M)	45
	Figure 8 – Examples of the application of cross references	49
	Figure 9 – Example of the use of symbols for fibre optics	51
	Figure 10 – Example of replacing a symbol with a general symbol	53
	Figure 11 – Example of enlarging a symbol	53
	Figure 12 – Turning and/or mirroring of symbol S00055 of IEC 60617	55
	Figure 13 – Terminators of dimension lines (from ISO 129)	59
	Figure 14 – Examples of leader lines (from ISO 128-22)	59

Figure 15 – Example of the use of leader lines to connecting lines	59
Figure 16 – Example of an explanatory note	61
Figure 17 – Presentation of reference designations of a reference designation set	63
Figure 18 – The common initial portion of reference designations	63
Figure 19 – Examples of cable core designations	65
Figure 20 – Example of functional grouping and signal flow directions; a control system.....	67
Figure 21 – Example of symbols and different location of connections	69
Figure 22 – Simplified presentation.....	69
Figure 23 – Simplified presentation of parallel connected identical objects	71
Figure 24 – Simplified presentation of serial connected identical objects	71
Figure 25 – Example for technical data associated with a symbol	73
Figure 26 – Example of technical data shown inside a symbol	73
Figure 27 – Symbols representing joining of connecting lines	73
Figure 28 – Symbol representing the interconnection of crossing connecting lines.....	73
Figure 29 – Examples of the joining of connecting lines	75
Figure 30 – Example of the joining of connecting lines with indication of where the physical wire goes	75
Figure 31 – Example of the joining of connecting lines where the connecting lines represent bundles of wires.....	75
Figure 32 – Example of presentations of mechanical links	77
Figure 33 – Example for avoiding bends and cross-overs	77
Figure 34 – Spacing of lines	79
Figure 35 – Examples for technical data associated with connecting lines	79
Figure 36 – Presentation of bundles.....	81
Figure 37 – Indication of sequence within bundles	81
Figure 38 – Illustration of the terms “states” and “levels”.....	83
Figure 39 – Detail of a circuit diagram using positive logic convention	85
Figure 40 – Detail of a circuit diagram using direct logic polarity convention	85
Figure 41 – Boundary frame with a reference to another document.....	87
Figure 42 – Location of reference designations at a symbol.....	87
Figure 43 – Examples of reference designations associated with connecting lines	89
Figure 44 – Presentation of reference designations at a boundary frame	89
Figure 45 – Presentation of reference designations including different aspect.....	91
Figure 46 – Presentation of reference designation sets at a boundary frame.....	91
Figure 47 – Presentation of reference designation	93
Figure 48 – Presentation of reference designations excluded from concatenation.....	93
Figure 49 – Examples for the presentation of terminal designations.....	95
Figure 50 – Examples of signal designations associated with connecting lines	95

Figure 51 – Examples of reference and signal designations ass. with connecting lines	97
Figure 52 – Presentation of signal designations	97
Figure 53 – Example for a multi-phase circuit	99
Figure 54 – Overview diagram for a material handling plant (Example taken from IEC 61346-1)	101
Figure 55 – Overview diagram for one conveyer belt function (Example taken from IEC 61346-1)	103
Figure 56 – Overview diagram process plant.....	103
Figure 57 – Overview diagram of an electrical plant.....	105
Figure 58 – Signal flow in a function diagram.....	107
Figure 59 – Example of an equivalent-circuit diagram	107
Figure 60 – Minimized use of logic negations.....	109
Figure 61 – Lining-up of symbols	111
Figure 62 – Grouping of symbols for functionally related components.....	111
Figure 63 – Attached presentation of symbols.....	113
Figure 64 – Detached presentation of symbols.....	115
Figure 65 – Example of the use of inset tables.....	117
Figure 66 – Example of presentation of internal connection	119
Figure 67 – Repeated presentation of a symbol for a quadruple multiplexer.....	119
Figure 68 – Simplified repeated presentation of a symbol for a quadruple multiplexer.....	121
Figure 69 – Symbol of a switch supplemented with a graph	123
Figure 70 – Examples of pilot switch.....	123
Figure 71 – Symbol of a pilot switch supplemented with a note.....	123
Figure 72 – Orientation of contact symbols	125
Figure 73 – Representation of a.c. supply circuits.....	125
Figure 74 – Representation of d.c. supply circuits.....	127
Figure 75 – Examples of use of logic polarity indication	127
Figure 76 – Examples of mismatched polarity indications.....	127
Figure 77 – Example of a split presentation of a symbol.....	129
Figure 78 – Example of a connection diagram.....	133
Figure 79 – Example of presentation of termination of a multi-core cable.....	135
Figure 80 – Example of cable connections.....	137
Figure 81 – Example of connection diagram for a sub-rack.....	139
Figure 82 – Example of simplified presentation of a connection diagram.....	141
Figure 83 – Example of the use of a base document.....	145
Figure 84 – Presentation of technical data	147
Figure 85 – Examples of the use of symbols for indication mounting methods.....	149
Figure 86 – An arrangement drawing the mounting panel of a cubicle.....	151
Figure 87 – An arrangement drawing of an industrial plant.....	153
Figure 88 – Example setting the common initial portion in the table header.....	155
Figure 89 – Example omitting the common initial portion on successive lines.....	155

Figure 90 – Example of a terminal-oriented connection table	157
Figure 91 – Example of a connection table with remote end designations	159
Figure 92 – Example of a connection-oriented connection table	159
Figure 93 – Example of a time sequence chart.....	161
Figure 94 – Example of an instance diagram of a motor starter	165
Figure 95 – A symbol for a motor starter	165
Figure 96 – Example of a table describing the relations between external terminals of a motor starter to the internal terminals of its components	167
Figure 97 – A symbol for the motor starter, for single-line presentations	167
Figure 98 – Example of a table describing the relations between external terminals of a motor starter to the internal terminals of its components	169
Figure 99 – Referencing in accordance with IEC 62023	171
Figure 100 – Direct referencing.....	173
Figure A.1 – The general symbols for an object in IEC 60617 DB	177
Figure A.2 – Miniature circuit-breaker shown with the symbol for a circuit-breaker	179
Figure A.3 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbol for automatic tripping	179
Figure A.4 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for automatic tripping.....	181
Figure A.5 – Miniature circuit-breaker shown with the general symbol for a switch qualified with the symbols for thermal and electromagnetic effects.....	181
Figure A.6 – Miniature circuit-breaker shown with the symbol for a circuit-breaker qualified with the symbol for thermal and electromagnetic effects	181
Figure A.7 – Symbol for a miniature circuit-breaker with an RCD, version 1	183
Figure A.8 – Symbol for a miniature circuit-breaker with an RCD, version 2	183
Figure A.9 – Symbol for a miniature circuit-breaker with an RCD, version 3	185
Figure A.10 – Example of a symbol for an RCD	185
Figure A.11 – Example of a symbol for an RCM	187
Figure A.12 – Symbols for a PLC	189
Figure A.13 – A circuit diagram with a symbol of a PLC	191
Figure B.1 – Example of the arrangement of information in a title block	195
Figure B.2 – Example of a filled-in title block	195
Figure B.3 – Examples of locations of identification areas and possible title blocks.....	197
Table 1 – Possible distributed logic connections	131
Table B.1 – Metadata element names	193
Table C.1 – Recommended document kind designations.....	201
Table C.2 – Current document kind designations and replacements.....	205

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PREPARATION OF DOCUMENTS USED IN ELECTROTECHNOLOGY

Part 1: Rules

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, 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 61082-1 has been prepared by IEC technical committee 3: Information structures, documentation and graphical symbols.

FDIS	Report on voting
3/771/FDIS	3/798/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 second edition is a consolidated version of IEC 61082 Parts 1 to 4 and cancels and replaces the first editions of them published correspondingly in 1991, 1993, 1996. This second edition constitutes technical revisions.

Compared to the first editions, the following substantial changes have been made:

- the scope of IEC 61082 has been gradually shifted from the rules of preparation of documents to the rules of presentation of information in documents;
- the information is split in a way to establish general rules that are valid for the preparation of all document kinds, to more specific rules for specific document kinds;
- terminology has been improved in a way that terms related to document kinds are clearly differentiated from those related to forms of presentations;
- the publication is focusing on rules that support the legibility of a document and not on the process of developing the document;
- examples in the publication are shown only to that extent necessary for the understanding of the concepts described. The use of comprehensive examples and diagrams are limited as such examples do not illustrate rules more efficiently than small sketches.

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

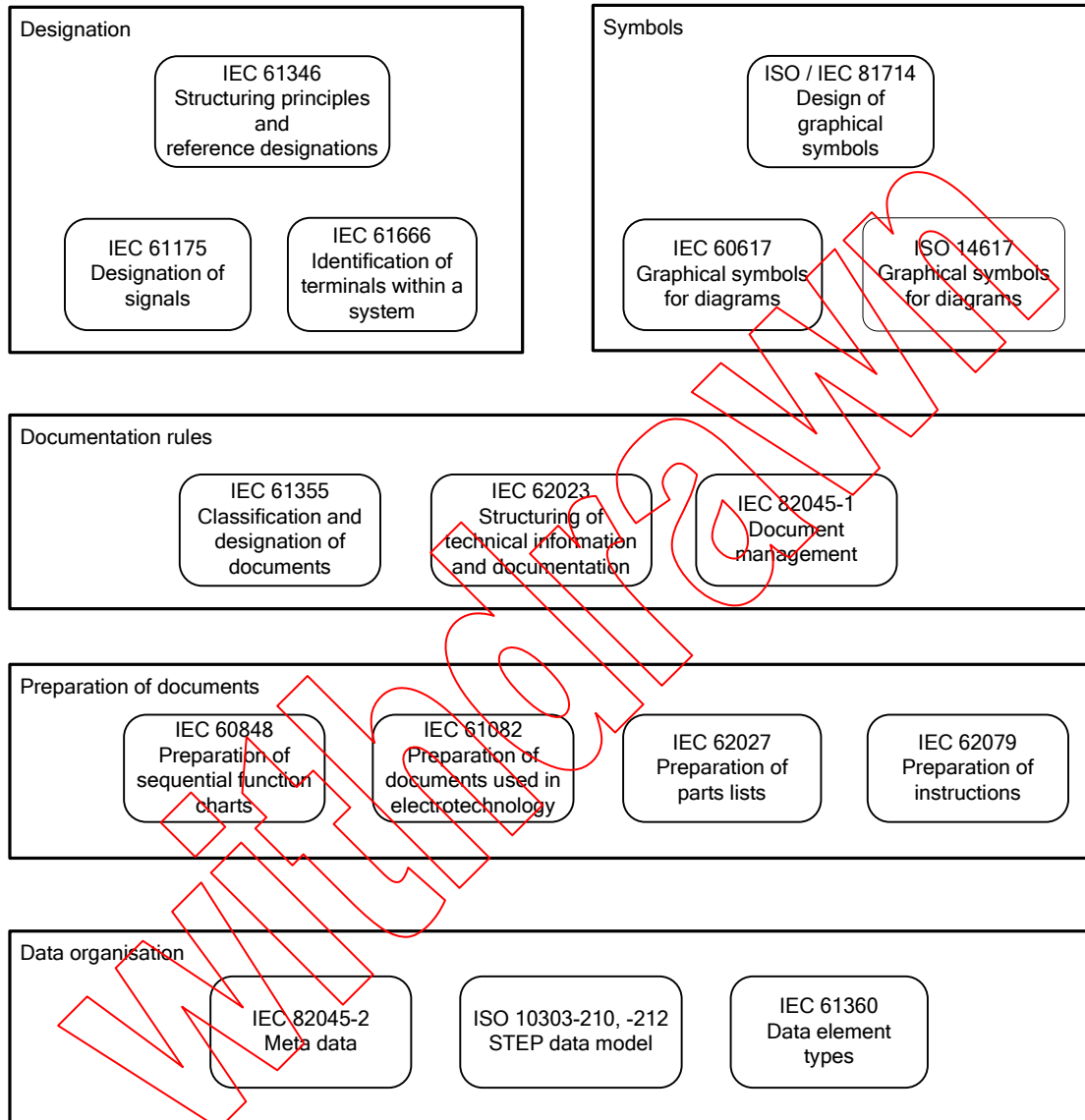
The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

Withdrawn

INTRODUCTION

IEC 61082 deals with the presentation of information in documents. Part of this information is described in other International Standards. The following illustration provides an overview on the interrelation between some of these standards.



Examples in this part are intended to illustrate a given rule and are not necessarily representative of complete documents.

PREPARATION OF DOCUMENTS USED IN ELECTROTECHNOLOGY

Part 1: Rules

1 Scope

This part of IEC 61082 provides general rules and guidelines for the presentation of information in documents, and specific rules for diagrams, drawings and tables used in electrotechnology

Excluded from this standard are rules and guidelines for all kind of audio or video presentations.

2 Normative references

The following referenced documents are indispensable for the application 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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60375:2003, *Conventions concerning electric and magnetic circuits*

IEC 60757:1983, *Code for designation of colours*

IEC 60617-DB: 2001, *Graphical symbols for diagrams*

IEC 60848:2002, *GRAFSET specification language for sequential function charts*

IEC 61175:2005, *Industrial systems, installations and equipment and industrial products- Designation of signals*

IEC 61286:2001, *Information technology – Coded graphic character set for use in the preparation of documents used in electrotechnology and for information interchange*

IEC 61293:1994, *Marking of electrical equipment with ratings related to electrical supply – Safety requirements*

IEC 61346-1:1996, *Industrial systems, installations and equipment and industrial products – Structuring principles and reference designations – Part 1: Basic rules*

IEC 61355:1997, *Classification and designation of documents for plants, systems and equipment*

IEC 61666:1997, *Industrial systems, installations and equipment and industrial products – Identification of terminals within a system*

IEC 61804-1:2003, *Function blocks (FB) for process and control – Part 1: Overview of system aspects*

IEC 61804-2:2004, *Function blocks (FB) for process and control – Part 2: Specification of FB concept and Electronic Device Description Language (EDDL)*

IEC 62023:2000, *Structuring of technical information and documentation*

IEC 62027:2000, *Preparation of parts lists*

IEC 62079:2001, *Preparation of instructions – Structuring, content and presentation*

IEC 81714-2:1998, *Design of graphical symbols for use in the technical documentation of products – Part 2: Specification for graphical symbols in a computer-sensible form including graphical symbols for a reference library, and requirements for their interchange*

IEC 82045-1:2001, *Document management – Part 1: Principles and methods*

IEC 82045-2:2004, *Document management – Part 2: Metadata elements and information reference model*

ISO 31 (all parts), *Quantities and units*¹

ISO 128-22:1999, *Technical drawings – General principles of presentation – Part 22: Basic conventions and applications for leader lines and reference lines*

ISO 128-30:2001, *Technical drawings – General principles of presentation – Part 30: Basic conventions for views*

ISO 2594:1972, *Building drawings – Projection methods*

ISO 3098-5:1997, *Technical product documentation – Lettering – Part 5: CAD- lettering of the Latin alphabet, numerals and marks*

ISO 5807:1985, *Information processing – Documentation symbols and conventions for data, program and system flowcharts, program network charts and system resources charts*

ISO 5455:1979, *Technical drawings – Scales*

ISO 5456-2:1996, *Technical drawings – Projection methods – Part 2: Orthographic representations*

ISO 5457:1999, *Technical product documentation – Sizes and layout of technical drawing sheets*

ISO 10209-1:1992, *Technical product documentation – Vocabulary – Part 1: Terms relating to technical drawings: general and types of drawings*

ISO 10628:1997, *Flow diagrams for process plants – General rules*

ISO 14617 (all parts), *Graphical symbols for diagrams*

ISO 81714-1:1999, *Design of graphical symbols for use in the technical documentation of products – Part 1: Basic rules*

¹ Published as a compilation in ISO Standards Handbook, Quantities and units.