



ISO/IEC 11801-6

Edition 1.0 2017-11

INTERNATIONAL STANDARD

**Information technology – Generic cabling for customer premises –
Part 6: Distributed building services**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.200

ISBN 978-2-8322-5036-5

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

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	6
1 Scope.....	9
2 Normative references	9
3 Terms, definitions and abbreviated terms	10
3.1 Terms and definitions.....	10
3.2 Abbreviated terms.....	11
4 Conformance.....	11
5 Structure of the generic cabling system	12
5.1 General.....	12
5.2 Functional elements.....	12
5.2.1 Stand-alone structure	12
5.2.2 Overlay structure	13
5.3 General structure and hierarchy.....	13
5.3.1 Type A generic cabling	13
5.3.2 Type B generic cabling	14
5.4 Cabling subsystems	15
5.4.1 Campus and building backbone cabling subsystem.....	15
5.4.2 Service distribution cabling subsystem (Type A generic cabling).....	15
5.4.3 Service distribution cabling subsystem (Type B generic cabling).....	15
5.4.4 Design objectives	16
5.5 Accommodation of functional elements	16
5.5.1 General	16
5.5.2 Accommodation of service outlets.....	16
5.5.3 Accommodation of service concentration points.....	17
5.6 Interfaces.....	17
5.6.1 Equipment interfaces and test interfaces	17
5.6.2 Channels and links	18
5.7 Dimensioning and configuring	19
5.7.1 General	19
5.7.2 Type A generic cabling	21
5.7.3 Type B generic cabling	22
5.7.4 Service concentration point.....	23
5.7.5 Connecting hardware.....	23
5.7.6 Telecommunications rooms and equipment rooms	23
5.8 Relevant building services	23
6 Channel performance requirements	23
6.1 General.....	23
6.2 Environmental performance	25
6.3 Transmission performance	25
6.3.1 General	25
6.3.2 Balanced cabling	25
6.3.3 Optical fibre cabling.....	26
7 Link performance requirements	26
7.1 General.....	26

- 7.2 Balanced cabling 27
- 7.3 Optical fibre cabling 27
- 8 Reference implementations 27
 - 8.1 General..... 27
 - 8.2 Balanced cabling 27
 - 8.2.1 General 27
 - 8.2.2 Service distribution cabling (Type A generic cabling) 28
 - 8.2.3 Service distribution cabling (Type B generic cabling) 31
 - 8.2.4 Campus and building backbone cabling 31
 - 8.3 Optical fibre cabling 31
 - 8.3.1 Service distribution cabling (Type A generic cabling) 31
 - 8.3.2 Service distribution cabling (Type B generic cabling) 32
 - 8.3.3 Campus and building backbone cabling 32
- 9 Cable requirements 32
 - 9.1 General..... 32
 - 9.2 Balanced cables 32
 - 9.3 Optical fibre cables 32
- 10 Connecting hardware requirements 32
 - 10.1 General requirements 32
 - 10.2 Connecting hardware for balanced cabling..... 32
 - 10.2.1 General requirements 32
 - 10.2.2 Electrical, mechanical and environmental performance 32
 - 10.3 Connecting hardware for optical fibre cabling..... 33
- 11 Cords 33
 - 11.1 Jumpers..... 33
 - 11.2 Balanced cords 33
 - 11.3 Optical fibre cords..... 33
- Annex A (informative) Services and applications 34
 - A.1 Overview..... 34
 - A.2 Service sectors and services..... 34
 - A.2.1 Access control 34
 - A.2.2 Burglar alarms 35
 - A.2.3 Asset management 35
 - A.2.4 Audio-visual..... 35
 - A.2.5 Building information systems 35
 - A.2.6 Building well-being and structural sensor systems 35
 - A.2.7 Energy management..... 35
 - A.2.8 Environmental control 36
 - A.2.9 Fixed information technology services 36
 - A.2.10 Personal well-being 36
 - A.2.11 Shared information technology services..... 36
 - A.3 Service concentration point grid density 38
 - A.4 Cabling provision to service concentration points 39
- Annex B (informative) Overlay 40
 - B.1 General..... 40
 - B.2 Functional elements..... 40
 - B.2.1 Type A generic cabling 40
 - B.2.2 Type B generic cabling 40

B.3	General structure and hierarchy	40
B.3.1	Type A generic cabling	40
B.3.2	Type B generic cabling	40
Annex C (informative)	Optical fibre within the Type B service distribution cabling subsystem	41
C.1	Overview	41
C.2	Implementation recommendations	41
C.2.1	Channel performance	41
C.2.2	Reference implementation	41
C.2.3	Cables	42
C.2.4	Connecting hardware	42
C.2.5	Cords	42
Bibliography	43
Figure 1	– Relationships between the generic cabling documents produced by ISO/IEC JTC 1/SC 25	7
Figure 2	– Structure of Type A generic cabling.....	13
Figure 3	– Hierarchical structure of Type A generic cabling.....	14
Figure 4	– Structure of Type B generic cabling.....	14
Figure 5	– Hierarchical structure of Type B generic cabling.....	15
Figure 6	– Accommodation of functional elements	16
Figure 7	– Cabling without the use of an SO	17
Figure 8	– Accommodation of TEs (Type B generic cabling).....	17
Figure 9	– Test and equipment interfaces (Type A generic cabling)	18
Figure 10	– Test and equipment interfaces (Type B generic cabling).....	18
Figure 11	– Example of a Type A generic cabling system with combined BD and SD	20
Figure 12	– Connection of functional elements providing redundancy for Type A generic cabling	20
Figure 13	–Transmission performance of a service distribution channel	24
Figure 14	– Example of a system showing the location of cabling interfaces	25
Figure 15	– Link options.....	27
Figure 16	– Service distribution cabling models	29
Figure A.1	– Wireless application coverage area grid.....	38
Figure C.1	– Combined optical fibre backbone and service distribution channels	42
Table 1	– Maximum channel lengths for Type A reference implementations	21
Table 2	– Maximum channel lengths for Type B reference implementations	22
Table 3	– Service distribution channel length formulae in metres	30
Table A.1	– Supported wireless applications	37
Table A.2	– Recommended SCP grid dimensions	39
Table A.3	– Estimated SOs per SCP	39

INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES –

Part 6: Distributed building services

FOREWORD

- 1) ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.
- 2) The formal decisions or agreements of IEC and ISO 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 and ISO member bodies.
- 3) IEC, ISO and ISO/IEC publications have the form of recommendations for international use and are accepted by IEC National Committees and ISO member bodies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC, ISO and ISO/IEC publications is accurate, IEC or ISO 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 and ISO member bodies undertake to apply IEC, ISO and ISO/IEC publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any ISO, IEC or ISO/IEC publication and the corresponding national or regional publication should be clearly indicated in the latter.
- 5) ISO and IEC do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. ISO or IEC are 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 ISO or its directors, employees, servants or agents including individual experts and members of their technical committees and IEC National Committees or ISO member bodies 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 of, use of, or reliance upon, this ISO/IEC publication or any other IEC, ISO or ISO/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 ISO/IEC publication may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 11801-6 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

ISO/IEC 11801-6 is to be read in conjunction with ISO/IEC 11801-1, which was created to consolidate general requirements for generic cabling into a single standard which allows the other standards in the ISO/IEC 11801 series to have a common reference.

This International Standard has been approved by vote of the member bodies, and the voting results can be obtained from the address given on the second title page.

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

A list of all parts in the ISO/IEC 11801 series, published under the general title *Information technology – Generic cabling for customer premises*, can be found on the IEC website.

The contents of the corrigendum of April 2018 have been included in this copy.

INTRODUCTION

The importance of cabling infrastructure is similar to that of other fundamental utilities such as water and energy supply and interruptions to the services provided over that infrastructure can have a serious impact. A lack of design foresight, the use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten quality of service and have commercial consequence for all types of users.

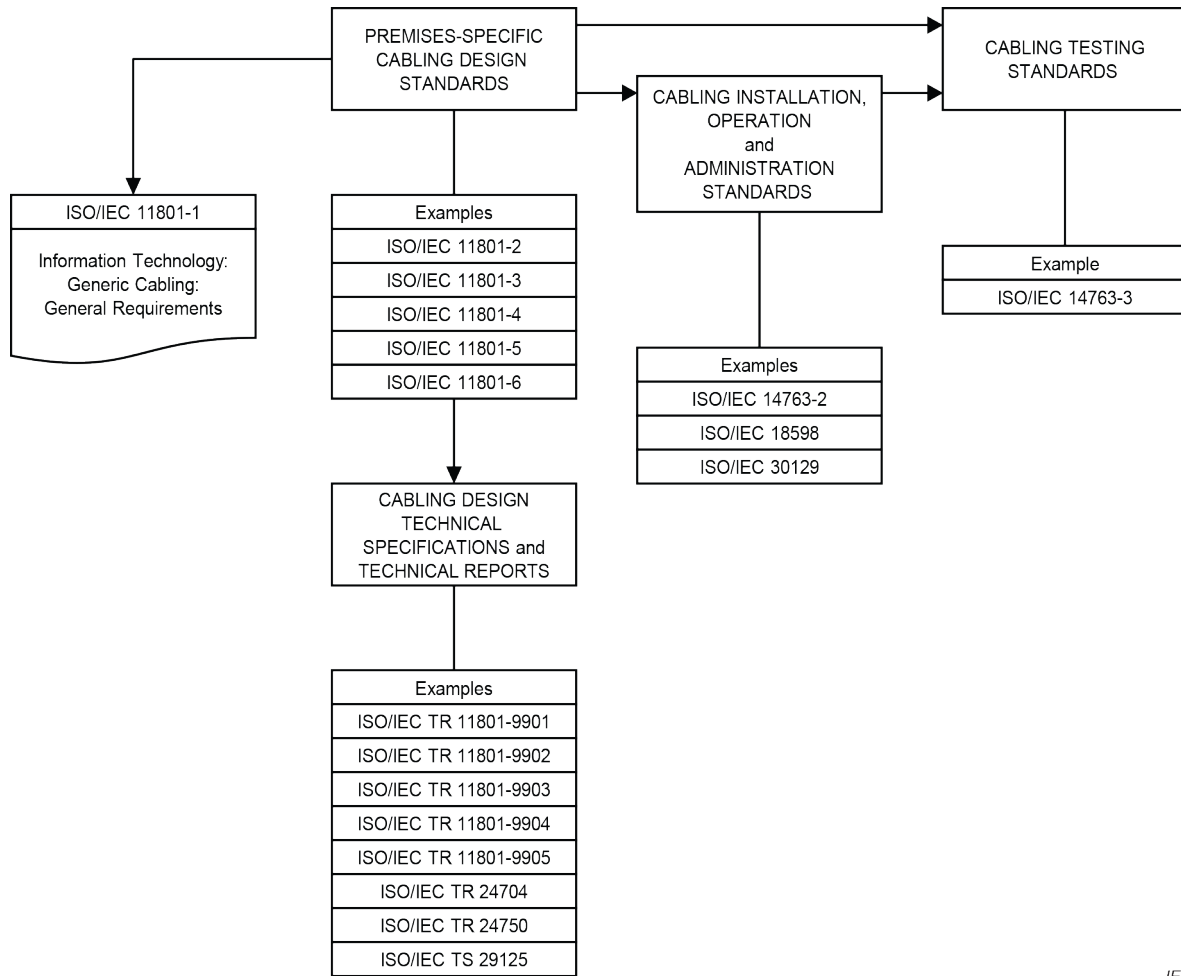
This document specifies generic cabling for distributed building services and can be used alone or in conjunction with all the premises-specific standards of the ISO/IEC 11801 series.

It has been prepared to reflect the increasing use of generic cabling in support of non-user specific services and the sharing of information between such services, many of which require the use of remote powered devices. The distribution of these services is implemented either as a stand-alone structure and configuration or as an overlay provided to locations other than those specified by premises-specific standards in the ISO/IEC 11801 series.

This document is not intended to replace the application of other premises-specific standards in the ISO/IEC 11801 series but has been prepared in recognition of the fact that, although certain functional elements of distributed building services cabling can be co-located with those of other generic cabling infrastructures, they can be

- a) specified, installed and operated by different entities than those responsible for other generic cabling infrastructures that are installed within the premises,
- b) specified and installed at a different time than other generic cabling infrastructures that are installed within the premises.

Figure 1 shows the schematic and contextual relationships between the standards relating to information technology cabling produced by ISO/IEC JTC 1/SC 25, namely the ISO/IEC 11801 series of standards for generic cabling design, standards for the installation, operation and administration of generic cabling and for testing of installed generic cabling.



IEC

Figure 1 – Relationships between the generic cabling documents produced by ISO/IEC JTC 1/SC 25

The generic cabling specified by this document provides users with

- a) an application independent system capable of supporting a wide range of applications in a range of installation and operating environments,
- b) a flexible scheme such that modifications are both easy and economical,
- c) a multi-vendor supply chain within an open market for cabling components.

In addition, this document provides

- d) relevant industry professionals with guidance allowing the accommodation of cabling before specific requirements are known, i.e. in the initial planning either for construction or refurbishment and for further deployment as the requirements of areas are defined,
- e) industry and standardization bodies with a cabling system which supports current products and provides a basis for future product development and applications standardization.

Applications addressed in this document include, but are not limited to those applications in ISO/IEC 11801:2017, Annex E, as used to support the following services:

- 1) telecommunications, e.g. wireless access points, distributed antenna systems;
- 2) energy management, e.g. lighting, power distribution, incoming utility metering;
- 3) environmental control, e.g. temperature, humidity;
- 4) personnel management, e.g. access control, cameras, passive infra-red (PIR) detectors, time and attendance monitoring, electronic signage, audio-visual projectors;

- 5) personal information and alarms, e.g. paging, patient monitoring, nurse call, infant security;
- 6) intelligent building systems;
- 7) communications between devices (i.e. “internet of things”).

Physical layer requirements for the applications listed in ISO/IEC 11801-1:2017, Annex E have been analysed to determine their compatibility with the cabling performance specified in this document and, together with statistics concerning premises geography from different countries and the models described in Clause 6, have been used to develop the requirements for cabling components and to stipulate their arrangement into cabling systems.

As a result, this document

- specifies a structure for generic cabling supporting a wide variety of applications including, but not restricted to, the applications in ISO/IEC 11801-1:2017, Annex E,
- adopts balanced cabling channel and link Classes E_A, F and F_A, specified in ISO/IEC 11801-1:2017,
- adopts optical fibre cabling channel and link requirements as specified in ISO/IEC 11801-1,
- adopts component requirements, specified in ISO/IEC 11801-1, and specifies cabling implementations that ensure performance of permanent links and of channels that meet or exceed the requirements of a specified group (e.g. Class) of applications.

Life expectancy of generic cabling systems can vary depending on environmental conditions, supported applications, aging of materials used in cables, and other factors such as access to pathways (campus pathways are more difficult to access than building pathways). With appropriate choice of components, generic cabling systems meeting the requirements of this document are expected to have a life expectancy of at least ten years.

This document has taken into account requirements specified in application standards listed in ISO/IEC 11801-1:2017, Annex E. It refers to International Standards for components and test methods whenever appropriate International Standards are available.

INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES –

Part 6: Distributed building services

1 Scope

This part of ISO/IEC 11801 specifies generic cabling within premises that comprise single or multiple buildings on a campus. It covers balanced cabling and optical fibre cabling.

This document has been prepared to reflect the increasing use of generic cabling in support of non-user specific services and the sharing of information between such services that can also incorporate the supply of power, including

- 1) telecommunications, e.g. wireless access points, distributed antenna systems,
- 2) energy management, e.g. lighting, power distribution, incoming utility metering,
- 3) environmental control, e.g. temperature, humidity,
- 4) personnel management, e.g. access control, cameras, PIR detectors, time and attendance monitoring, electronic signage, audio-visual projectors,
- 5) personal information and alarms, e.g. paging, patient monitoring, nurse call, infant security,
- 6) intelligent building systems.

This document specifies directly or via reference to ISO/IEC 11801-1

- a) the structure and configuration for generic cabling for distributed building services,
- b) the interfaces at the service outlet (SO),
- c) the performance requirements for cabling links and channels,
- d) the implementation requirements and options,
- e) the performance requirements for cabling components,
- f) the conformance requirements and verification procedures.

Safety (e.g. electrical safety and protection, fire) and electromagnetic compatibility (EMC) requirements are outside the scope of this document, and are covered by other standards and by regulations. However, information given by this document can be of assistance.

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.

ISO/IEC 11801-1:2017, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ISO/IEC 14763-2, *Information technology – Implementation and operation of customer premises cabling – Part 2: Planning and installation*

ISO/IEC 30129, *Information technology – Telecommunications bonding networks for buildings and other structures*