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Connectors for electrical and electronic equipment – Part 7: Detail specification for up to 7 ways including PE or FE (data/power) and shield pin, free and fixed circular connectors for balanced single-pair data transmission with current-carrying capacity – Mechanical mating information, pin assignment and additional requirements for type 7

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 7: Detail specification for up to 7 ways including PE or FE (data/power) and shield pin, free and fixed circular connectors for balanced single-pair data transmission with current-carrying capacity – Mechanical mating information, pin assignment and additional requirements for type 7

FOREWORD

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IEC 63171-7 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment. It is an International Standard.

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

Draft	Report on voting
48B/3033/FDIS	48B/3044/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 63171 series, published under the general title *Connectors for electrical and electronic equipment*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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- withdrawn,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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 63171 is the base specification of the whole series. Subsequent specifications do not duplicate information given in the base document, but list only additional requirements. For the complete specification regarding connectors described in this Part of the IEC 63171 series, read this document in conjunction with IEC 63171.

A general overview about the connectors in this document is shown in Figure 1.

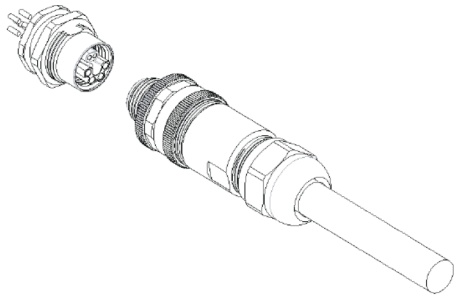
IEC SC 48B – Electrical connectors **Specification available from:** **IEC General secretariat or from the addresses shown on the inside cover.**	**IEC 63171-7 Ed. 1**
DETAIL SPECIFICATION in accordance with IEC 61076-1	M12 screw locking or push-pull locking (or both)
 IEC	Circular connectors, size 12, with 4 up to 7 ways including PE or FE (according to coding) for power and data transmission, either – with M12 screw-locking mechanism (styles with M12 in the name), or – with a quick-locking push-pull mechanism with a size derived from that (styles with P12 in the name), or – with both mechanisms combined (styles with C12 in the name). Multiple mating interfaces, each associated with a coding referred to as "type I" through "type VII", differing by power transmission capabilities and intents. 2 ways + additional shield pin (to be connected to the cable sheath) support balanced differential data transmission with frequencies up to 600 MHz, Category B as per IEC 63171. Free cable connectors: – male or female, – straight connectors, – rewireable or non-rewireable.
 IEC	Fixed connectors: – male or female, – single-hole mounting. With circular mounting orientation

Figure 1 – Type 7 connector overview

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT –

Part 7: Detail specification for up to 7 ways including PE or FE (data/power) and shield pin, free and fixed circular connectors for balanced single-pair data transmission with current-carrying capacity – Mechanical mating information, pin assignment and additional requirements for type 7

1 Scope

This part of IEC 63171 covers shielded free and fixed circular connectors with 4 ways up to 7 ways for power and data transmission and specifies the common dimensions, mechanical, electrical and transmission characteristics and environmental requirements as well as test specifications respectively.

The connectors described in this document are either equipped with an M12 screw-locking mechanism (styles with M12 in the name) or a quick-locking push-pull mechanism with a size derived from that (styles with P12 in the name) or both mechanisms combined (styles with C12 in the name). For the sake of simplicity, the connectors' size is denoted as "size 12" in this document.

This document provides multiple mating interfaces each of which is associated with a coding preventing the mating of incompatible male and female connectors. These codings are referred to as "Type x", where "x" is represented by a Roman numeral.

For all codings, two ways and the additional shield pin, which is intended to be connected to the cable screen, support differential data transmission with frequencies up to 600 MHz by meeting the requirements of Category B, as defined in IEC 63171.

NOTE 1 Connecting the shield pin to the cable sheath is also required for data transmission with 20 MHz (IEC 63171, Category A).

NOTE 2 The connectors are intended to be used for single-pair Ethernet (SPE) according to the following IEEE Standards: 10BASE-T1 (IEEE 802.3cg), 100BASE-T1 (IEEE 802.3bw), 1000BASE-T1 (IEEE 802.3bp).

NOTE 3 Power over Data line (PoDL) power supply according to IEEE 802.3bu can be optionally used for the two ways intended for data transmission, even in addition to the power supply provided through the dedicated power ways.

The individual codings differ by their power transmission capabilities and intents. The additional ways provide for DC power transmission with up to 63 V/16 A and 600 V/16 A or AC power transmission with rated voltage and rated current up to 600 V/16 A (single-phase) or 480 V/8 A (three-phase). See Table 11 and Table 12 for the voltage and current ratings, and Table 5 for the pin assignments for the individual codings.

Some codings feature a PE pin for safety purposes.

The PE pin needs to be connected to all accessible metal parts.

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 60050-581, *International Electrotechnical Vocabulary – Chapter 581: Electromechanical components for electronic equipment*

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60352 (all parts), *Solderless connections*

IEC 60512-1, *Connectors for electronic equipment – Tests and measurements – Part 1: General*

IEC 60512-1-1, *Connectors for electronic equipment – Tests and measurements – Part 1-1: General examination – Test 1a: Visual examination*

IEC 60512-1-2, *Connectors for electronic equipment – Tests and measurements – Part 1-2: General examination – Test 1b: Examination of dimension and mass*

IEC 60512-2-1, *Connectors for electronic equipment – Tests and measurements – Part 2-1: Electrical continuity and contact resistance tests – Test 2a: Contact resistance – Millivolt level method*

IEC 60512-3-1, *Connectors for electronic equipment – Tests and measurements – Part 3-1: Insulation tests – Test 3a: Insulation resistance*

IEC 60512-4-1, *Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof*

IEC 60512-5-2, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating*

IEC 60512-11-1, *Connectors for electrical and electronic equipment – Tests and measurements – Part 11-1: Climatic tests – Test 11a: Climatic sequence*

IEC 60512-11-9, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat*

IEC 60512-11-10, *Connectors for electronic equipment – Tests and measurements – Part 11-10: Climatic tests – Test 11j: Cold*

IEC 60512-11-12, *Connectors for electronic equipment – Tests and measurements – Part 11-12: Climatic tests – Test 11m: Damp heat, cyclic*

IEC 60512-13-2, *Connectors for electronic equipment – Tests and measurements – Part 13-2: Mechanical operation tests – Test 13b: Insertion and withdrawal forces*

IEC 60512-13-5, *Connectors for electronic equipment – Tests and measurements – Part 13-5: Mechanical operation tests – Test 13e: Polarizing and keying method*

IEC 60512-28-100, *Connectors for electronic equipment – Tests and measurements – Part 28-100: Signal integrity tests up to 1000 MHz on 60603-7 and 61076-3 series connectors – Tests 28a to 28g*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61076-1:2006, *Connectors for electronic equipment – Product requirements – Part 1: Generic specification*

IEC 61076-3, *Connectors for electronic equipment – Product requirements – Part 3: Sectional specification for rectangular connectors*

IEC 61984:2008, *Connectors – Safety requirements and tests*

IEC TR 63040, *Guidance on clearances and creepage distances in particular for distances equal to or less than 2 mm – Test results of research on influencing parameters*

IEC 63171:2021*, Connectors for Electrical and Electronic Equipment – Shielded or unshielded free and fixed connectors for balanced single-pair data transmission with current carrying capacity; General requirements and tests*

ISO 21920-1:2021, *Geometrical product specifications (GPS) – Surface texture: Profile – Part 1: Indication of surface texture*