

# INTERNATIONAL STANDARD



**Fibre optic interconnecting devices and passive components – Fibre optic  
isolators –  
Part 1: Generic specification**

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COMMISSION

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ICS 33.180.20

ISBN 978-2-8322-3681-9

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## CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions .....	7
3.1 Basic terms and definitions .....	7
3.2 Component terms and definitions .....	7
3.3 Performance parameter terms and definitions .....	8
4 Requirements .....	10
4.1 Classification .....	10
4.1.1 General .....	10
4.1.2 Type .....	10
4.1.3 Style .....	11
4.1.4 Variant.....	11
4.1.5 Normative reference extensions.....	11
4.2 Documentation.....	12
4.2.1 Symbols .....	12
4.2.2 Specification system.....	12
4.2.3 Drawings .....	13
4.2.4 Tests and measurements.....	13
4.2.5 Test data sheets.....	14
4.2.6 Instructions for use.....	14
4.3 Standardization system.....	14
4.3.1 Interface standards.....	14
4.3.2 Performance standards.....	14
4.3.3 Reliability standards .....	14
4.3.4 Interlinking.....	15
4.4 Design and construction.....	16
4.4.1 Materials .....	16
4.4.2 Workmanship.....	16
4.5 Performance requirements.....	16
4.6 Identification and marking .....	17
4.6.1 General .....	17
4.6.2 Variant identification number .....	17
4.6.3 Component marking.....	17
4.6.4 Package marking .....	17
4.7 Packaging.....	18
4.8 Storage conditions .....	18
4.9 Safety .....	18
Annex A (informative) Example of technology of bulk isolator based on magneto-optic effect.....	19
A.1 General.....	19
A.2 Faraday rotator .....	19
A.3 Analyser .....	19
A.4 Birefringent crystal.....	19

Annex B (informative) Example of technology of optical waveguide isolator .....	22
B.1 General.....	22
B.2 TE mode .....	22
B.3 TM mode .....	22
Bibliography.....	24
Figure 1 – Configuration A – Device containing integral fibre optic pigtails without connector.....	11
Figure 2 – Configuration B – Device containing integral fibre optic pigtails, with a connector on each pigtail .....	11
Figure 3 – Configuration C – Device containing connectors as an integral part of the device housing.....	11
Figure 4 – Configuration D – Device containing some combination of the interfacing features of the preceding configurations .....	11
Figure 5 – Standards currently under preparation .....	16
Figure A.1 – Polarization dependent optical isolator.....	20
Figure A.2 – Polarization independent optical isolator .....	21
Figure B.1 – Mode conversion type of the optical waveguide isolator .....	22
Figure B.2 – Phase shifter type of the optical waveguide isolator .....	23
Figure B.3 – TE mode and TM mode for optical waveguide isolator .....	23
Table 1 – Two-level IEC specification structure.....	12
Table 2 – Standards interlink matrix.....	16

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## **FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC ISOLATORS –**

### **Part 1: Generic specification**

#### FOREWORD

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International Standard IEC 61202-1 has been prepared by subcommittee 86B: Fibre optic interconnecting devices and passive components, of IEC technical committee 86: Fibre optics.

This fourth edition cancels and replaces the third edition published in 2009. It constitutes a technical revision.

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

- a) the terms and definitions were reconsidered;
- b) quality assessment level was deleted from classification;
- c) the clause numbers of Annexes A and B have been rearranged.

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

CDV	Report on voting
86B/3989A/CDV	86B/4033RVC

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 61202 series, published under the general title *Fibre optic interconnecting devices and passive components – Fibre optic isolators*, can be found on the IEC website.

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

**IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.**

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# FIBRE OPTIC INTERCONNECTING DEVICES AND PASSIVE COMPONENTS – FIBRE OPTIC ISOLATORS –

## Part 1: Generic specification

### 1 Scope

This part of IEC 61202 applies to isolators used in the field of fibre optics, all exhibiting the following features:

- they are non-reciprocal optical devices, in which each port is either an optical fibre or fibre optic connector;
- they are passive devices containing no opto-electronic or other transducing elements;
- they have two optical ports for directionally transmitting optical power.

### 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 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60050-731, *International Electrotechnical Vocabulary – Chapter 731: Optical fibre communication*

<https://standards.iteh.ai/catalog/standards/iec/b5d83386-ba46-4bc1-ae89-d71dfa1dd6be/iec-61202-1-2016>

IEC 60617 (all parts), *Graphical symbols for diagrams* (available at <http://std.iec.ch/iec60617>)

IEC 60695 (all parts), *Fire hazard testing*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 61300 (all parts), *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures*

IEC TS 62627-09, *Fibre optic interconnecting devices and passive components – Vocabulary for passive optical devices*

ISO 129-1, *Technical drawings – Indication of dimensions and tolerances – Part 1: General principles*

ISO 286-1, *Geometrical product specification (GPS) – ISO code system for tolerances on linear sizes – Part 1: Bases of tolerances, deviations and fits*

ISO 1101, *Geometrical product specifications (GPS) – Geometrical tolerancing – Tolerances of form, orientation, location and run-out*

ISO 8601, *Data elements and interchange formats – Information interchange – Representation of dates and times*



### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-731, IEC TS 62627-09 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1 Basic terms and definitions

##### 3.1.1

**port**

optical fibre or fibre optic connector attached to a passive component for the entry and/or exit of the optical power

##### 3.1.2

**input port**

port for the entry of optical power

Note 1 to entry: An isolator is a directional device. The input port should be clearly marked.

##### 3.1.3

**output port**

port for the exit of optical power

Note 1 to entry: An isolator is a directional device. The output port should be clearly marked.

##### 3.1.4

**backward direction**

<optical isolator> operational direction in which the power of the optical source launches into the output port of an isolator

Note 1 to entry: This is the direction of optical power isolation.

##### 3.1.5

**forward direction**

<optical isolator> operational direction in which the power of the optical source launches into the input port of an isolator

Note 1 to entry: This is the intentional direction of optical power transmission.

#### 3.2 Component terms and definitions

##### 3.2.1

**fibre optic isolator**

non-reciprocal optical device intended to suppress backward reflections along an optical fibre transmission line while having minimum insertion loss in the forward direction

Note 1 to entry: Fibre optic isolators are commonly used to avoid reflections back into laser diodes and optical amplifiers, which can make the laser and amplifiers oscillations unstable, and cause noise in the fibre optic transmission system.

##### 3.2.2

**bulk isolator based on magneto-optic effect**

type of isolator with discrete components including a suitable magneto-optic crystal (ferromagnetic crystal or paramagnetic glass, diamagnetic glass, etc.), of which the fundamental principle is based on magneto-optic effect

Note 1 to entry: The technology of a bulk isolator based on magneto-optic effect is described in Annex A.

### 3.2.3

#### **in-line isolator**

type of isolator with optical fibre for the entry input and output of the light

### 3.2.4

#### **optical waveguide isolator**

type of isolator with planer epitaxial magneto-optic crystal layers on a suitable substrate

Note 1 to entry: The technology of an optical waveguide isolator is described in Annex B.

### 3.2.5

#### **polarization-dependent optical isolator**

type of isolator not designed to have performance independent of the state of the polarization of the incident light

### 3.2.6

#### **polarization-independent optical isolator**

type of isolator in which the optical performance characteristics are independent of the polarization state of the incident light

### 3.2.7

#### **polarization maintaining optical isolator**

type of isolator with a polarization maintaining optical fibre for input and output, designed to maintain polarization of the light, and which is adjusted to the optical axis of the polarization maintaining optical fibre

### 3.2.8

#### **single-stage isolator**

type of isolator composed of a basic isolator unit such as a set of polarizer, faraday rotator and analyser

### 3.2.9

#### **dual-stage isolator**

#### **double-stage isolator**

type of isolator composed of two basic isolator units connected in tandem for the purpose of obtaining more backward loss

### 3.2.10

#### **PMD compensated optical isolator**

type of isolator designed to compensate the polarization mode dispersion which is intrinsic to the birefringent crystal

## 3.3 Performance parameter terms and definitions

### 3.3.1

#### **operating wavelength**

wavelength at which a passive optical component is designed to operate with the specified performance

### 3.3.2

#### **operating wavelength range**

specified range of wavelengths including all operating wavelengths

Note 1 to entry: In the case of an optical isolator as nominally a wavelength independent and wavelength non-selective device, passband is nominally same as operating wavelength range.