



BSI Standards Publication

Power transformers

Part 22-8: Power transformer and reactor fittings — Devices
suitable for use in communication networks

National foreword

This British Standard is the UK implementation of EN IEC 60076-22-8:2021. It is identical to IEC 60076-22-8:2021.

The UK participation in its preparation was entrusted to Technical Committee PEL/14, Power transformers.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2021
Published by BSI Standards Limited 2021

ISBN 978 0 539 12801 7

ICS 29.180

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2021.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

English Version

Power transformers - Part 22-8: Power transformer and reactor fittings - Devices suitable for use in communication networks
(IEC 60076-22-8:2021)

Transformateurs de puissance - Partie 22-8: Accessoires pour transformateurs de puissance et bobines d'inductance
- Dispositifs compatibles avec les réseaux de communication
(IEC 60076-22-8:2021)

Leistungstransformatoren - Teil 22-8: Zubehörteile von Leistungstransformatoren und Drosselspulen - Einrichtungen mit Eignung zur Anwendung in Kommunikationsnetzen
(IEC 60076-22-8:2021)

This European Standard was approved by CENELEC on 2021-07-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 14/1057/CDV, future edition 1 of IEC 60076-22-8, prepared by IEC/TC 14 "Power transformers" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60076-22-8:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-04-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-07-20

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60076-22-8:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60076-1	NOTE	Harmonized as EN 60076-1
IEC 60296	NOTE	Harmonized as EN IEC 60296
ISO 9001	NOTE	Harmonized as EN ISO 9001

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60076-22-1	2019	Power transformers - Part 22-1: Power transformer and reactor fittings - Protective devices	EN IEC 60076-22-1	2019
IEC 60076-22-7	-	Power transformers - Part 22-7: Power transformer and reactor fittings - Accessories and fittings	EN IEC 60076-22-7	-
IEC 61000-6-4	-	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	EN IEC 61000-6-4	-
IEC 61000-6-5	-	Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment	EN 61000-6-5	-

This page deliberately left blank

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 General requirements	8
4.1 Standard compliance	8
4.2 Modbus requirements	8
4.3 Type tests for EMC	9
4.3.1 Emission.....	9
4.3.2 Immunity.....	9
4.4 Additional requirements	9
4.4.1 Terminals	9
4.4.2 Signal and control ports	9
4.5 Cybersecurity.....	10
5 Power supply.....	10
6 Devices	10
6.1 Gas and liquid actuated relays (Buchholz relays).....	10
6.1.1 General	10
6.1.2 4 mA to 20 mA output	10
6.1.3 Modbus output.....	10
6.1.4 Tests	11
6.2 Protective relays for hermetically sealed liquid-immersed equipment	11
6.2.1 General	11
6.2.2 4 mA to 20 mA output	11
6.2.3 Modbus output.....	11
6.2.4 Tests	11
6.3 Direct reading dial type liquid level indicators	12
6.3.1 General	12
6.3.2 4 mA to 20 mA output	12
6.3.3 Modbus output.....	12
6.3.4 Tests	12
6.4 Pressure relief devices with continuous pressure monitoring.....	12
6.4.1 General	12
6.4.2 4 mA to 20 mA output	13
6.4.3 Modbus output.....	13
6.4.4 Routine test.....	13
6.5 Electronic pressure and pressure rise monitoring systems	13
6.5.1 General	13
6.5.2 4 mA to 20 mA output	13
6.5.3 Modbus output.....	13
6.5.4 Tests	14
6.6 Direct reading mechanical dial type liquid temperature indicators.....	15
6.6.1 General	15
6.6.2 4 mA to 20 mA output	15
6.6.3 Modbus output.....	15

6.6.4	Routine tests	15
6.7	Direct reading mechanical dial type winding temperature indicators	15
6.7.1	General	15
6.7.2	4 mA to 20 mA output	15
6.7.3	Modbus output.....	16
6.7.4	Routine tests	16
6.8	Electrical and electronic liquid temperature measuring devices	16
6.8.1	General	16
6.8.2	4 mA to 20 mA output	16
6.8.3	Modbus output.....	16
6.8.4	Tests	16
6.9	Electrical and electronic winding temperature simulating devices	17
6.9.1	General	17
6.9.2	4 mA to 20 mA output	17
6.9.3	Modbus output.....	17
6.9.4	Tests	17
6.10	Dehydrating breathers, self-regenerating types	18
6.10.1	General	18
6.10.2	4 mA to 20 mA output	18
6.10.3	Modbus output.....	19
6.10.4	Routine tests	19
6.11	Dissolved gas analysis devices (DGA devices)	19
6.11.1	General	19
6.11.2	4 mA to 20 mA output	19
6.11.3	Modbus output.....	20
6.11.4	Tests	20
Bibliography		21
Figure 1	– Pressure rise response curves for oil (left) or gas (right) space applications	14
Table 1	– Summary of Modbus parameters	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

POWER TRANSFORMERS –

**Part 22-8: Power transformer and reactor fittings –
Devices suitable for use in communication networks**

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, Publicly Available Specifications (PAS) 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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is 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 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.

IEC 60076-22-8 has been prepared by IEC technical committee 14: Power transformers. It is an International Standard.

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

CDV	Report on voting
14/1057/CDV	14/1062A/RVC

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.