



BSI Standards Publication

Aerospace series — Circuit breakers, single-pole, temperature compensated, rated currents 20 A to 50 A

Part 001: Technical specification

National foreword

This British Standard is the UK implementation of EN 3661-001:2024. It supersedes BS EN 3661-001:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/6, Aerospace avionic electrical and fibre optic technology.

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 2024
Published by BSI Standards Limited 2024

ISBN 978 0 539 26720 4

ICS 49.060

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 December 2024.

Amendments/corrigenda issued since publication

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

English Version

**Aerospace series - Circuit breakers, single-pole,
temperature compensated, rated currents 20 A to 50 A -
Part 001: Technical specification**

Série aérospatiale - Disjoncteurs unipolaires
compensés en température, intensités nominales 20 A
à 50 A - Partie 001 : Spécification technique

Luft- und Raumfahrt - Schutzschalter, einpolig,
temperaturkompensiert, Nennströme von 20 A bis 50
A - Teil 001: Technische Lieferbedingungen

This European Standard was approved by CEN on 6 October 2024.

CEN 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 CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents	Page
European foreword	3
1 Scope.....	4
2 Normative references.....	4
3 Terms and definitions	5
4 Description.....	5
5 Design.....	6
5.1 Materials	6
5.1.1 Metallic materials	6
5.1.2 Insulation materials.....	6
5.2 Design.....	6
5.2.1 Insulating box.....	6
5.2.2 Free release mechanism.....	6
5.2.3 Attachment.....	6
5.2.4 Electrical connection units	6
5.2.5 Control actuator	7
5.2.6 Rating inviolability.....	7
5.2.7 Leakage lines	7
5.2.8 Protection against non-release.....	7
6 Characteristics	7
6.1 General characteristics	7
6.2 Ratings	8
6.3 Nominal voltage of main contacts	8
6.4 Signal contact performances	8
6.5 Dimensional characteristics	8
6.6 Recommended panel mounting dimensions	8
7 Tests.....	9
7.1 Mechanical tests	9
7.2 Environmental tests.....	10
7.3 Electrical tests.....	15
8 Qualification tests.....	17
8.1 Sampling.....	17
8.2 Material tests.....	21
8.3 Periodic checks for qualification maintenance	21
9 Quality assurance	21
10 Marking	21
11 Delivery conditions	21
12 Packaging.....	21
13 Storage	21
13.1 Definition	21
13.2 Storage conditions.....	21
13.3 Storage duration	22
Bibliography	23

European foreword

This document (EN 3661-001:2024) has been prepared by ASD-STAN.

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

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

This document supersedes EN 3661-001:2006.

The main changes with respect to the previous edition are as follows:

— EN 3661-001 (P4), 08/2006:

- o g_n replaced by g -PK for sinusoidal and low frequencies;
- o g_n replaced by Grms for random.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies the single-pole temperature compensated circuit breakers with signal contacts, polarized or not, rated from 20 A to 50 A and used in aircraft on-board circuits. It describes specific environmental, electrical and mechanical characteristics and the stringency of tests to be applied according to test methods of EN 3841-100.

These circuit breakers are intended for use in aircraft with electrical supplies in accordance with EN 2282.

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.

EN 2083, *Aerospace series — Copper or copper alloy conductors for electrical cables — Product standard*

EN 2825, *Aerospace series — Burning behaviour of non-metallic materials under the influence of radiating heat and flames — Determination of smoke density*

EN 2826, *Aerospace series — Burning behaviour of non-metallic materials under the influence of radiating heat and flames — Determination of gas components in the smoke*

EN 3841-100,¹ *Aerospace series — Circuit breakers — Test methods — Part 100: General*

EN 3841-201, *Aerospace series — Circuit breakers — Test methods — Part 201: Visual inspection*

EN 3841-202, *Aerospace series — Circuit breakers — Test methods — Part 202: Dimensions and masses*

EN 3841-301:2004, *Aerospace series — Circuit breakers — Test methods — Part 301: Voltage drop*

EN 3841-302, *Aerospace series — Circuit breakers — Test methods — Part 302: Insulation resistance*

EN 3841-303, *Aerospace series — Circuit breakers — Test methods — Part 303: Dielectric strength*

EN 3841-304, *Aerospace series — Circuit breakers — Test methods — Part 304: Tripping points*

EN 3841-305, *Aerospace series — Circuit breakers — Test methods — Part 305: Short-circuit performance*

EN 3841-306, *Aerospace series — Circuit breakers — Test methods — Part 306: Service life*

EN 3841-307, *Aerospace series — Circuit breakers — Test methods — Part 307: Performance with a locked tripping system*

EN 3841-308, *Aerospace series — Circuit breakers — Test methods — Part 308: Lightning*

EN 3841-401, *Aerospace series — Circuit breakers — Test methods — Part 401: Sand and dust*

EN 3841-402, *Aerospace series — Circuit breakers — Test methods — Part 402: Corrosion*

EN 3841-403, *Aerospace series — Circuit breakers — Test methods — Part 403: Humidity*

¹ Published as ASD-STAN prEN at the date of publication of this document, available at: <https://www.asd-stan.org/>.

- EN 3841-404, *Aerospace series — Circuit breakers — Test methods — Part 404: Explosion proofness*
- EN 3841-405, *Aerospace series — Circuit breakers — Test methods — Part 405: Fluid resistance*
- EN 3841-406, *Aerospace series — Circuit breakers — Test methods — Part 406: Flammability*
- EN 3841-501, *Aerospace series — Circuit breakers — Test methods — Part 501: Actuator button travel*
- EN 3841-502, *Aerospace series — Circuit breakers — Test methods — Part 502: Operating forces*
- EN 3841-503, *Aerospace series — Circuit breakers — Test methods — Part 503: Strength of actuating components*
- EN 3841-504, *Aerospace series — Circuit breakers — Test methods — Part 504: Strength of mounting elements*
- EN 3841-505, *Aerospace series — Circuit breakers — Test methods — Part 505: Strength of main terminals*
- EN 3841-506, *Aerospace series — Circuit breakers — Test methods — Part 506: Vibration performance*
- EN 3841-507, *Aerospace series — Circuit breakers — Test methods — Part 507: Mechanical shocks*
- EN 3841-508, *Aerospace series — Circuit breakers — Test methods — Part 508: Centrifugal acceleration*
- EN 3841-509, *Aerospace series — Circuit breakers — Test methods — Part 509: Insertion and extraction forces of signal contact terminals*
- EN 3841-510, *Aerospace series — Circuit breakers — Test methods — Part 510: Strength of signal contact terminals*
- EN 3841-511, *Aerospace series — Circuit breakers — Test methods — Part 511: Combined test: temperature, altitude and vibration*
- EN 3844-1, *Aerospace series — Flammability of non-metallic materials — Part 1: Small burner test, vertical — Determination of the vertical flame propagation*
- MIL-I-81969/1A,² *Installing and removal tools, connector electrical contact, type III, class 2, composition C*
- MIL-I-81969/14C,² *Installing and removal tools, connector electrical contact, type III, class 2, composition B*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3841-100 apply.

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

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

4 Description

These circuit breakers are operated by a “push-pull” type single push button (actuator) and with delayed action “trip-free” tripping. Their function is ensured up to the short-circuit current.

² Published by Department of Defense (DOD), available at: <https://assist.dla.mil/online/start/>.

5 Design

5.1 Materials

5.1.1 Metallic materials

All metallic parts shall be resistant to corrosion or finished against corrosion. When dissimilar materials are in close contact, an adequate protection against corrosion shall be used so that the electromotive force of the galvanic couple does not exceed 0,25 V.

When bimetals are used, an eventual corrosion shall not affect the good operation of the circuit breaker.

5.1.2 Insulation materials

The insulating parts shall be made of auto-extinguishing or non-flammable materials; they shall not emit damaging or explosive vapours, even in presence of fire or internal electric arc.

They shall be insensitive to moulds and microorganisms' action.

Application of any material or protective coating, which might crack, break or flake shall be forbidden.

Materials which are not specified, or which are not specially described shall be as light as possible for the requested use.

Materials shall be selected according to security criteria (toxicity, smoke density) as defined in contractual documents.

5.2 Design

5.2.1 Insulating box

The insulating box shall integrate besides the mechanism, the connection and attachment unit.

5.2.2 Free release mechanism

Design of circuit breaker mechanism shall allow free release, i.e. the circuit breaker cuts out in case of overload, and remains cut out even if the actuator is kept by force in engaged position.

A new engagement of circuit breaker is only possible after a first total release of the control actuator.

The operation in these conditions shall not affect further performances of the circuit breaker.

5.2.3 Attachment

All visible parts shall be black coloured and non-reflective.

5.2.4 Electrical connection units

They shall be able to receive the lugs (or contacts).