BS EN 3662-001:2024

BSI Standards Publication

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

Part 001: Technical specification

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National foreword

This British Standard is the UK implementation of EN 3662-001:2024. It supersedes BS EN 3662-001:2006, which is withdrawn.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.

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

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European foreword

This document (EN 3662-001:2024) 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of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.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 3662-001:2006.

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

— EN 3662-001 (P4), 08/2006:

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

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1 Scope

This document specifies the three-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*

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

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

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,[3] *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/

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

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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.

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).

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5.2.5 Control actuator

In engaged position, the visible part of the control actuator shall be of the colour stated in the product standard. In disengaged (or opened) position, the control actuator shall show a white strip.

The outer part of this actuator shall be isolated from all under voltage parts.

The control actuator shall not stay in a transition position or give a false indication about the circuit breaker condition. It shall not be removable.

When pushing it, power contacts of the circuit breaker engage and indicating contact opens.

When pulling it, power contacts of the circuit breaker open and indicating contact closes.

The circuit breaker rating is indicated in indelible white colour on the front part of the control actuator.

The product standard gives the digits positioning.

5.2.6 Rating inviolability

The circuit breaker shall be designed in such a way that the calibration unit cannot be reached without breaking a sealing.

5.2.7 Leakage lines

The leakage lines and the minimal space to be foreseen between the under-voltage parts and any other part of the circuit breaker made of non-insulating material, as well as between the undervoltage parts of opposite polarity, shall be sufficient to avoid any default or arc tracking in all uses and climatic conditions.

5.2.8 Protection against non-release

Electrical overload happening on a circuit breaker locked in its engaged position (sticked contacts or non-operating release mechanism), shall cause the opening of the circuit-by-circuit breaker destruction without any fire or important smoke release.

6 Characteristics

6.1 General characteristics

General characteristics shall be according to Table 1.

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