



# SLOVENSKI STANDARD

## SIST EN 3773-001:2015

01-januar-2015

Nadomešča:

SIST EN 3773-001:2002

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**Aeronavtika - Odklopniki, enopolni, temperaturno kompenzirani, naznačeni tok od 1 A do 25 A - 001. del: Tehnična specifikacija**

Aerospace series - Circuit breakers, single-pole, temperature compensated, rated currents 1 A to 25 A - Part 001: Technical specification

Luft- und Raumfahrt - Schutzschalter, einpolig, temperaturkompensiert, Nennströme von 1 A bis 25 A - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Disjoncteurs unipolaires compensés en température, intensités nominales 1 A à 25 A - Partie 001: Spécification technique

**Ta slovenski standard je istoveten z: EN 3773-001:2014**

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**ICS:**

49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems
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**SIST EN 3773-001:2015**

**en,fr,de**

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EUROPEAN STANDARD

EN 3773-001

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2014

ICS 49.060

Supersedes EN 3773-001:1999

English Version

## Aerospace series - Circuit breakers, single-pole, temperature compensated, rated currents 1 A to 25 A - Part 001: Technical specification

Série aérospatiale - Disjoncteurs unipolaires compensés en température, intensités nominales 1 A à 25 A - Partie 001: Spécification technique

Luft- und Raumfahrt - Schutzschalter, einpolig, temperaturkompensiert, Nennströme von 1 A bis 25 A - Teil 001: Technische Lieferbedingungen

This European Standard was approved by CEN on 12 October 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## Foreword

This document (EN 3773-001:2014) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

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

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.

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

This document supersedes EN 3773-001:1999.

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

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**EN 3773-001:2014 (E)****1 Scope**

This European Standard specifies the single-pole temperature compensated circuit breakers rated from 1 A to 25 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 and copper alloys conductors for electrical cables - Product standard*

EN 2282, *Aerospace series - Characteristics of aircraft electrical supplies*

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, *Aerospace series - Circuit breakers - Test methods - Part 100: General*

EN 3844-1, *Aerospace series - Flammability of non metallic materials - Part 1: Small burner test, vertical - Determination of the vertical flame propagation*

EN 9133, *Aerospace series - Quality management systems - Qualification procedure for aerospace standard parts*

TR 6083, *Aerospace series — Cut-outs for installation of electrical components* <sup>1)</sup>

**3 Terms and definitions**

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

**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 assured up to the short-circuit current.

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<sup>1)</sup> Published as ASD-STAN Technical Report at the date of publication of this standard. <http://www.asd-stan.org/>

## 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 micro-organisms action.

Application of any material or protective coating, which might crack, break on 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

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#### 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.

#### 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.

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The outer part of this actuator shall be isolated from all undervoltage 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.

When pulling it, power contacts of the circuit breaker open.

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 Clearances and creepage distances**

The clearances, creepage distances and the minimal space to be foreseen between the energized parts and any other part of the circuit breaker made of conductive material, as well as between the energized parts of opposite polarity, shall be sufficient to avoid any default or arcing 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.

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**6 Characteristics****6.1 General characteristics**

See Table 1.



Table 1 — General characteristics

Designation	Requirements
Assembly	See product standard.
Mass	See product standard.
Operational altitude	See product standard.
Power contact connection	See product standard.
1 input terminal on power supply side (identified by digit 1)	
1 output terminal on distribution side (identified by digit 2)	
Operational ambient temperatures limits	From – 55 °C to 125 °C
Temperature compensation	From – 55 °C to 125 °C See product standard.
Rating marking	On control actuator (indelible white)

## 6.2 Ratings

See product standard.

## 6.3 Nominal voltage of operational circuits

See product standard.

## 6.4 Dimensional characteristics

See product standard.

## 6.5 Recommended panel mounting dimensions

Panel cut-out: The panel cut-out is in accordance with the designation TR6083C202

Spacing : 20 mm horizontal and 25 mm vertical from the centre of the mounting holes.

Panel thickness : 1 mm to 3 mm

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## 7 Tests

## 7.1 Mechanical tests

See Table 2.

Table 2 — Mechanical tests

Tests				Requirements	
Visual check				EN 3841-201	
Operational force		Closing force (push)		EN 3841-502	3,5 N to 45 N
		Opening force (pull)			5 N to 30 N
Mechanical strength	Actuator	Travel		EN 3841-501 For value, see product standard.	
		Transverse load		EN 3841-503	≥ 110 N
		Longitudinal load	Push		≥ 110 N
	Pull		≥ 110 N		
	Attachment nut	Tightening torque		EN 3841-504	≥ 5 N.m
		Rotation torque			≥ 3 N.m
	Main contact connection	Screw tightening torque		EN 3841-505	≥ 2 N.m
Tensile force as per $F_1$ (see Figure 1 in product standard).		≥ 110 N			
Pressure force as per $F_2$ (see Figure 1 in product standard).		≥ 55 N			

## 7.2 Environmental tests

See Table 3.

Table 3 — Environmental conditions (1 of 2)

Tests		Requirements	
Combined tests. Ambient temperature 70 °C and vibrations (see notes).	Sinusoidal (see Figure 1). Duration: — circuit breaker in the "closed" position; — 0,9 $I_n$ load – Seven cycles/axis – 1 octave/min; — no load – Two cycles/axis – 1 octave/min. — circuit breaker in the "opened" position; — two cycles/axis – 1 octave/min.	See EN 3841-506.	5 Hz to 80 Hz – Constant amplitude 2 a = 0,76 mm
			80 Hz to 500 Hz – Constant acceleration = 10 $g_n$
			500 Hz to 2 000 Hz – Constant acceleration = 5 $g_n$
	Random (see Figure 2). Duration: — circuit breaker in the "closed" position; — 0,9 $I_n$ load – 15 min/axis; — no load – 15 min/axis; — circuit breaker in the "opened" position; — 15 min/axis.		10 Hz to 2 000 Hz – Constant acceleration = 5,8 $g_n$
	Low frequencies (see Figure 3). Applicability: see product standard. Duration: — circuit breaker in the "closed" position; — 0,9 $I_n$ load – Two cycles/axis; — no load – Two cycles/axis. — circuit breaker in the "opened" position; — two cycles/axis.		10 Hz to 27 Hz to 10 Hz – Constant acceleration = 10 $g_n$
Combined tests. Ambient temperature 85 °C, cabin max. altitude 4 600 m and vibrations (see notes).	Sinusoidal – Applicability: see product standard. Duration: — circuit breaker in the "closed" position; — 0,9 $I_n$ load – Four cycles/axis – 1 octave/min; — no load – Two cycles/axis – 1 octave/min. — circuit breaker in the "opened" position; — two cycles/axis – 1 octave/min.	See EN 3841-511.	5 Hz to 54 Hz – Constant shift 2 a = 0,5 mm