



SLOVENSKI STANDARD
SIST EN 3774-001:2002
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Aerospace series - Circuit breakers, three-pole, temperature compensated, rated currents 2 A to 25 A, switching capacity 25 /n - Part 001: Technical specification

Aerospace series - Circuit breakers, three-pole, temperature compensated, rated currents 2 A to 25 A, switching capacity 25 /n - Part 001: Technical specification

Luft- und Raumfahrt - Schutzschalter, dreipolig, temperaturkompensiert, Nennströme von 2 A bis 25 A, Schaltvermögen 65 /n - Teil 001: Technische Lieferbedingungen

Série aérospatiale - Disjoncteurs tripolaires compensés en température, intensités nominales 2 A a 25 A, pouvoir de coupure 65 /n - Partie 001: Spécification technique

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ICS:

49.060 Štejni in električni opremljeni sistemi za letalstvo in vesoljske sisteme
 Aerospace electric equipment and systems

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EUROPEAN STANDARD
 NORME EUROPÉENNE
 EUROPÄISCHE NORM

EN 3774-001

June 1999

ICS 49.060

English version

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This European Standard was approved by CEN on 4 September 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries 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 AECMA, 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 December 1999, and conflicting national standards shall be withdrawn at the latest by December 1999. (standards.iteh.ai)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.



1 Scope

This standard specifies the required characteristics for three-pole, temperature compensated circuit breakers, rated currents from 2 A to 25 A, switching capacity $65 I_n$, for use in aircraft electrical systems. Their operating temperatures are between -55 °C and 125 °C for rated currents equal or lower than 15 A and between -55 °C and 90 °C for rated currents higher than 15 A at a maximum altitude of $Z = 22\ 000\text{ m}$.

It shall be used together with EN 2350.

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

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 2282	Aerospace series - Characteristics of aircraft electrical supplies
EN 2350	Aerospace series - Circuit breakers - Technical specification
EN 3042	Aerospace series - Quality assurance - EN aerospace products - Qualification procedure

3 Definitions

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For the purposes of this standard, the definitions given in EN 2350 apply.

4 Description

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These circuit breakers are operated by a push-pull actuator button with trip-free release and delayed tripping; they are explosion-proof. Their operation is ensured up to the short-circuit current.

5 Required characteristics

Rated currents (I_n) and voltages

See tables 1 and 2.

Table 1 - Rated currents

Rated currents (I_n) A	2	2,5	3	5	7,5	10	15	20	25
Code	02A	2A5	03A	05A	7A5	10A	15A	20A	25A
Range	Low			Medium			High		
Button marking	2	$2\frac{1}{2}$	3	5	$7\frac{1}{2}$	10	15	20	25

Table 2 - Rated voltages

Rated voltage	115/200 V a.c., 400 Hz, three phase
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6 Tests

6.1 Mechanical tests

See table 3 and EN 2350.

Table 3 - Mechanical characteristics

Characteristics			Requirements	
Visual inspection			EN 2350	
Dimensions and mass			EN 2350	
Actuator button travel			EN 2350	
Operating force		Closing force	8 N to 80 N	
		Opening force	5 N to 30 N	
Mechanical strength	Actuator button	Transverse load		110 N min.
		Longitudinal load	Push direction	110 N min.
			Pull direction	110 N min.
		Mounting	Tightening torque	
	Rotational torque		3 Nm min.	
	Electrical connections	Tightening torque		1,7 Nm min.
		Pull force along F1 ¹⁾ Push force along F2 ¹⁾		110 N min. 55 N min.
1) See product standard.				

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6.2 Environmental tests

See table 4 and EN 2350.

Table 4 - Environmental conditions

Characteristics	Requirements
Vibration ¹⁾	5 Hz to 57 Hz, constant amplitude 2 a = 0,76 mm
	57 Hz to 350 Hz, constant acceleration 49 m/s ² ($\approx 5 g_n$)
	350 Hz to 500 Hz, constant amplitude 2 a = 0,02 mm
	500 Hz to 2 000 Hz, constant acceleration 98,1 m/s ² ($\approx 10 g_n$)
Mechanical shock ¹⁾	245,25 m/s ² ($\approx 25 g_n$)
Centrifugal acceleration ¹⁾	166,8 m/s ² ($\approx 17 g_n$)
Sand and dust	See EN 2350.
Corrosion	See EN 2350.
Humidity	See EN 2350. Category B: 10 cycles
Explosion proofness	Short-circuit current, see product standard.
Fluid contamination	See EN 2350.
1) Tightening torques for these tests: - electrical connections: 1,5 Nm to 1,7 Nm; - mounting: 3 Nm to 5 Nm.	

6.3 Electrical tests

See tables 5 to 12 and EN 2350.

Table 5 - Electrical characteristics

Characteristics		Requirements
Voltage drop		See table 6.
Insulation resistance		100 M Ω min.
Dielectric strength	- 1 500 V on ground $t = (23 \pm 5) ^\circ\text{C}$ $t = (-55 \pm 5) ^\circ\text{C}$ $t = (125 \pm 5) ^\circ\text{C}$ 1) $t = (90 \pm 5) ^\circ\text{C}$ 1)	Leakage current ≤ 1 mA No flashover, no damage
	400 V at 22 000 m $t = (23 \pm 5) ^\circ\text{C}$	
Minimum and maximum tripping points		See table 7.
Overload tripping times		See table 8.
Trip-free release		See table 8. At 23 $^\circ\text{C}$ and 200 % of I_n only.
Minimum tripping points at maximum altitude of 22 000 m (40 hPa)		
Ambient temperature $^\circ\text{C}$	-55	105 % of I_n
	23	105 % of I_n
	125	80 % of I_n
	90	80 % of I_n
Short-circuit performance		See table 9.
Service life at no load and at rated current		See table 10.
Service life under overload trip conditions		See table 11.
Overload test with mechanism locked		See table 12.
1) Where applicable		

Table 6 - Voltage drop

Rated current A	2	2,5	3	5	7,5	10	15	20	25
Maximum voltage drop at rated current V	0,80	0,75	0,55	0,35	0,30	0,30	0,25	0,25	0,20
Maximum voltage drop at minimum current 100 mA mV	40	30	18	8	4	2,5	2,5	2,5	2,5

Table 7 - Minimum and maximum tripping points

Rated current A	Temperature $\pm 5 ^\circ\text{C}$	Load as % of I_n	
		Min. tripping point > 1 h	Max. tripping point ≤ 1 h
2 to 25	23	110	140
2 to 15	125	90	140
20 and 25	90	90	140
2 to 25	-55	110	160
2 to 25	70	105	140

For detection of the minimum tripping point, the load shall be identical on all poles.

For detection of the maximum tripping point, the load shall be increased:

- by 20 % when one pole is loaded and the others are not loaded;
- by 10 % when two poles are loaded and the third is not loaded.

Table 8 - Overload tripping times

Rated current A	Temperature $\pm 5\text{ }^{\circ}\text{C}$	Overload as % of rated current					
		200		500		1 000	
		Three poles	One pole	Three poles	One pole	Three poles	One pole
Tripping times in seconds							
2 to 25	23	2 to 18	2 to 22	0,15 to 2,3	0,15 to 2,8	0,035 to 0,5	0,035 to 0,6
2 to 25	- 55	3 to 48	3 to 48				
20 and 25	90	1,5 to 17	1,5 to 20				
2 to 15	125	1 to 16	1 to 19				

Perform the test on the three poles in series.

When testing one pole, the others shall not be loaded.

Table 9 - Short-circuit performance

Rated voltage	115/200 V a.c., 400 Hz		
No load voltage	(120/208 \pm 5) V a.c., 400 Hz		
Short-circuit current establishment time	2 ms to 5 ms		
Test circuit			
	Test current	See product standard.	
Test altitude	Sea level		22 000 m
Number of specimens per range	One pole	Three poles	Three poles
	3 1)	See EN 2350, group 13	See EN 2350, group 14
Number of tests	CO 2) OCO 2)	3)	3)
1) Taken from groups 6, 15 and 16 2) See EN 2350. 3) See product standard.			