

**TEST REPORT**

**EN 60947-3**

**Low-voltage switchgear and controlgear**

**Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units**

Report reference No. . . . . .	: 95.4316.57
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Date of issue . . . . .	: 96-11-29
Testing laboratory . . . . .	: <b>KEMA Registered Quality Nederland B.V.</b>
Address . . . . .	: <b>Utrechtseweg 310, Arnhem, The Netherlands</b>
Testing location . . . . .	: <b>Socomec S.A., 1-4, Route de Westhouse, 67230 Benfeld, France</b> <i>All tests are observed by compiler</i>
Applicant . . . . .	: <b>Socomec S.A.</b>
Address . . . . .	: <b>1-4, Route de Westhouse, 67230 Benfeld, France</b>
Standard . . . . .	: IEC 947-3:1990
Test Report Form No. . . . . .	: 60947-3A
TRF date. . . . .	: 93-07
TRF originator. . . . .	: N.V. KEMA
Copyright blank test report . . . . .	: TRF originator and N.V. KEMA. This report is based on a blank test report that was prepared by N.V. KEMA using information obtained from the TRF originator.
Test procedure . . . . .	: CCA-scheme
Procedure deviation . . . . .	: N.A.
Non-standard test method . . . . .	: <b>IEC 695-2-1</b>
Type of test item . . . . .	: <b>switch-disconnector-fuse</b>
Trademark . . . . .	: <b>SOCOMEK</b>
Model/type reference . . . . .	: <b>FUSERBLOC 0 160A</b> <i>(description see page 20)</i>
Manufacturer . . . . .	: <b>Socomec S.A.</b>
Rating . . . . .	: <b>AC-23A</b> <b>500 V 160 A</b>  <b>Ui 750 Vac , Ith 160 A</b>

Copy of marking plate



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Test item particulars:

- method of operation . . . . . : ***independent manual operation***
- switching positions . . . . . : ***2 (on and off)***
- number of poles . . . . . : ***3-poles and 4-poles***
- kind of current . . . . . : ***AC***
- number of phases . . . . . : ***3***
- rated frequency (Hz) . . . . . : ***50 Hz***
- number of positions of the main contacts . . . . . : ***2 (on and off)***

Rated and limiting values, main circuit . . . . . :

- rated operational voltage  $U_e$  (V) . . . . . : ***500 V***
- rated insulation voltage  $U_i$  (V) . . . . . : ***750 V***
- rated impulse withstand voltage  $U_{imp}$  (kV) . . . . . : ***8 kV***
- conventional free air thermal current  $I_{th}$  (A) . . . . . : ***160 A***
- conventional enclosed thermal current  $I_{the}$  (A) : -
- rated operational current  $I_e$  (A) . . . . . : ***AC-23A***  
***500 V 160 A***
- rated uninterrupted current  $I_u$  (A) . . . . . : ***160 A***
- utilization category . . . . . : ***AC-23A***

Short-circuit characteristic . . . . . :

- rated short-time withstand current  $I_{cw}$  (kA) . . . . . : -
- rated short-time making capacity  $I_{cm}$  (kA) . . . . . : -
- rated conditional short-circuit current . . . . . : ***100 kA (400 V)***

Rated and limiting values, auxiliary circuits . . . . . : ***N***

- rated operational voltage (V) . . . . . :
- rated frequency (Hz) . . . . . :
- number of circuits . . . . . :
- number and kind of contact elements . . . . . :

Co-ordination of short-circuit protective devices :

- kind of protective device . . . . . : ***fuse-link, 160 A gG/gI, 500 V, size 0***

Possible test case verdicts:

- test case does not apply to the test object . . . . . : N(.A.)
- test object does meet the requirement . . . . . : P(ass)
- test object does not meet the requirement . . . . . : F(ail)

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

The test results presented in this report relate only to the item tested.

This report shall not be reproduced except in full without the written approval of the testing laboratory.

***The tests mentioned hereafter, unless otherwise stated, have been carried out on a 3-poles switch-disconnector-fuse***

***The making and breaking test and short-circuit test are carried out with a metallic screen placed at 100 mm all around switch-disconnector-fuse.***

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IEC 947-3			
Cl.	Requirement – Test	Result	Verdict

5.2	MARKING		
	Marking on equipment visible after mounting:		
	- indication of the open and closed position	<i>IO</i>	<i>P</i>
	- suitability for isolation		<i>P</i>
	- AC-20 and DC-20 only: marked "Do not open under load"		<i>N</i>
	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	<i>SOCOMEK</i>	<i>P</i>
	- type designation or serial number	<i>FUSERBLOC 0 160A</i>	<i>P</i>
	- rated operational current	<i>AC-23A</i> <i>500 V 160 A</i>	<i>P</i>
	- rated operational voltage	<i>500 V</i>	<i>P</i>
	- utilization category	<i>AC-23A</i>	<i>P</i>
	- rated frequency	<i>50 Hz</i>	<i>P</i>
	- manufacturer's claim for compliance with IEC 947-3	<i>IEC 947-3</i>	<i>P</i>
	- degree of protection		<i>N</i>
	Marking on fuse-combination units:		
	- fuse type	<i>0</i>	<i>P</i>
	- maximum rated current	<i>160 A</i>	<i>P</i>
	- power loss of the fuse-link	<i>15 W</i>	<i>P</i>
	Identification of terminals:		
	- line terminals	<i>immaterial</i>	<i>P</i>
	- load terminals	<i>immaterial</i>	<i>P</i>
	- neutral pole terminal		<i>N</i>
	- protective earth terminal		<i>N</i>
	Data in the manufacturer's published information:		
	- rated insulation voltage	<i>750 V</i>	<i>P</i>
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	<i>8 kV</i>	<i>P</i>
	- pollution degree, if different from 3	<i>3</i>	<i>P</i>
	- rated duty	<i>uninterrupted duty</i>	<i>P</i>
	- rated short-time withstand current and duration		<i>N</i>

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
	- rated short-circuit making capacity		<i>N</i>
	- rated conditional short-circuit current	<b>100 kA</b>	<i>P</i>

7.1	CONSTRUCTION		
7.1.2	Current-carrying parts and their connection	<i>no contact pressure through insulation material</i>	<i>P</i>
7.1.3	Clearances		
	Rated impulse withstand voltage	(see test sequence I)	<i>P</i>
	Creepage distances		
	Pollution degree . . . . .	<b>3</b>	—
	Comparative tracking index (V) . . . . .	<b>600 V</b>	—
	Material group . . . . .	<b>I</b>	—
	Rated insulation voltage $U_i$ (V) . . . . .	<b>750 V</b>	—
	Minimum creepage distances (mm) . . . . .	<b>10 mm</b>	—
	Measured creepage distances (mm) . . . . .	<b>20 mm</b>	<i>P</i>
	In case $U_{imp}$ is not indicated		<i>N</i>
7.1.4	Actuator		
7.1.4.1	Insulation	<i>thermoplastic material</i>	<i>P</i>
7.1.4.2	Direction of movement	<i>(IEC 447)</i>	<i>P</i>
7.1.5	Indication of contact position		
7.1.5.1	Indicating means	<i>by indication means</i>	<i>P</i>
7.1.5.2	Indication by the actuator		<i>N</i>
7.1.6	Additional safety requirements for equipment suitable for isolation		
7.1.6.1	Additional constructional requirements for equipment suitable for isolation ( $U_e > 50 V$ ):		
	- marking according to 5.2b		<i>P</i>
	- indication of the position of the contacts		<i>P</i>
	- construction of the actuating mechanism		<i>P</i>
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) . . . . .	<b>8 mm</b>	—
	- measured clearances (mm) . . . . .	<b>4 x 4,5 mm</b>	<i>P</i>
	- test $U_{imp}$ across gap (kV) . . . . .	<b>12,1 kV (200 m)</b>	<i>P</i>
7.1.7	Terminals		

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	(see 8.2.4 below)	<b>P</b>
	Terminal connections shall be such that necessary contact pressure is maintained	(see 8.2.4 below)	<b>P</b>
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	(see 8.2.4 below)	<b>P</b>
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	(see 8.2.4 below)	<b>P</b>
8.2.4	Mechanical properties of terminals		<b>P</b>
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm <sup>2</sup> ) . . . . . :	<b>cable lugs</b>	---
	diameter of thread (mm) . . . . . :	<b>M8</b>	---
	torque (Nm) . . . . . :	<b>13 Nm x 110 % = 14,3 Nm</b>	---
	5 times on 2 separate clamping units		<b>P</b>
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm <sup>2</sup> ) . . . . . :		---
	number of conductor of the smallest cross section . . . . . :		---
	diameter of bushing hole (mm) . . . . . :		---
	height between the equipment and the platen :		---
	mass at the conductor(s) (kg) . . . . . :		---
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
	Pull-out test		
	force (N) . . . . . :		---
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
	conductor of the largest cross-sectional area (mm <sup>2</sup> ) . . . . . :		---
	number of conductor of the largest cross section . . . . . :		---

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
	diameter of bushing hole (mm) . . . . . :		—
	height between the equipment and the platen :		—
	mass at the conductor(s) (kg) . . . . . :		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
	Pull-out test		
	force (N) . . . . . :		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
	conductor of the largest and smallest cross-sectional area (mm <sup>2</sup> ) . . . . . :		—
	number of conductor of the smallest cross section, number of conductor of the largest cross section . . . . . :		—
	diameter of bushing hole (mm) . . . . . :		—
	height between the equipment and the platen :		—
	mass at the conductor(s) (kg) . . . . . :		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
	Pull-out test		
	force (N) . . . . . :		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		<b>N</b>
7.1.7.2	Connection capacity		
	type of conductors . . . . . :	<i>cable lugs</i>	—
	minimum cross-sectional area of conductor (mm <sup>2</sup> ) . . . . . :		—
	maximum cross-sectional area of conductor (mm <sup>2</sup> ) . . . . . :		—
	number of conductors simultaneously connectable to the terminal . . . . . :		—
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		<b>P</b>
	clamping screws and nuts shall not serve to fix any other component		<b>P</b>

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		<i>N</i>
	protective earth terminal		<i>N</i>
	other terminals	<i>immaterial</i>	<i>P</i>
7.1.8	Additional requirements for equipment provided with a neutral pole		
	Marking of neutral pole		<i>N</i>
	The switched neutral pole shall not break before and shall not make after the other poles		<i>N</i>
	Conventional thermal current of neutral pole		<i>N</i>
7.1.9	Provisions for protective earthing		<i>N</i>
7.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		<i>N</i>
7.1.9.2	The protective earth terminal shall be readily accessible		<i>N</i>
	The protective earth terminal shall be suitably protected against corrosion		<i>N</i>
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		<i>N</i>
	The protective earth terminal shall have no other functions		<i>N</i>
7.1.9.3	Protective earth terminal marking and identification		<i>N</i>
7.1.10	Enclosure for equipment		
7.1.10.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		<i>N</i>
	Sufficient space shall be provided inside the enclosure		<i>N</i>
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		<i>N</i>

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		<i>N</i>
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		<i>N</i>
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		<i>N</i>
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		<i>N</i>
7.1.10.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		<i>N</i>
7.1.11	Degree of protection of enclosed equipment		<i>N</i>
	Degree of protection . . . . . :	IP	<i>N</i>

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IEC 947-3			
Cl.	Requirement – Test	Result	Verdict

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Temperature-rise		
	ambient temperature 10-40 °C . . . . .	<b>22 °C</b>	—
	test enclosure W x H x D (mm x mm x mm) . . .	-	—
	material of enclosure . . . . .		—
	Main circuits, test conditions:		
	- conventional thermal current I <sub>th</sub> (A) . . . . .	<b>160 A</b>	—
	- conventional enclosed thermal current I <sub>the</sub> (A) . . . . .		—
	- cable/busbar cross-section (mm <sup>2</sup> ) / (mm) . . .	<b>70 mm<sup>2</sup></b>	—
	Fuse-link details (fuse-combination units only):		<b>N</b>
	- manufacturer's name, trademark or identification mark . . . . .	<b>SOCOMEK</b>	—
	- manufacturer's model or type reference . . . .	<b>T. 0</b>	—
	- rated current (A) . . . . .	<b>160 A</b>	—
	- power loss . . . . .	<b>15 W</b>	—
	- rated breaking capacity (kA) . . . . .	<b>120 kA</b>	—
	Temperature-rise	(see appended table)	<b>P</b>
	Auxiliary circuits: temperature rise of connecting terminals (K) . . . . .		
	idem, requirement (K) . . . . .	≤	—
	rated operation current (A) . . . . .		—
	cross-section (mm <sup>2</sup> ) . . . . .		—
8.3.3.2	Test of dielectric properties, impulse withstand voltage (U <sub>imp</sub> indicated):		
	- rated impulse withstand voltage (V) . . . . .	<b>8 kV</b>	—
	- test U <sub>imp</sub> main circuits (kV) . . . . .	<b>9,6 kV (200 m)</b>	<b>P</b>
	- test U <sub>imp</sub> auxiliary circuits (kV) . . . . .		<b>N</b>
	- test U <sub>imp</sub> on open main contacts (equipment suitable for isolating) (kV) . . . . .	<b>12,1 kV (200 m)</b>	<b>P</b>
	Test of dielectric properties, dielectric withstand voltage (U <sub>imp</sub> not indicated):		
	- rated insulation voltage (V) . . . . .		—
	- main circuits, test voltage for 1 min (V) . . . .		<b>N</b>
	- control and auxiliary circuits, test voltage for 1 min (V) . . . . .		<b>N</b>

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
8.3.3.3	Making and breaking capacity		
	utilization category . . . . .	<b>AC-23A</b>	—
	rated operational voltage $U_e$ (V) . . . . .	<b>500 V</b>	—
	rated operational current $I_e$ (A) or power (kW) :	<b>160 A</b>	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage $U/U_e = 1,05$ (V) . . . . .	L1: <b>532 V</b> L2: <b>532 V</b> L3: <b>530 V</b>	—
	- test current $I/I_e =$ (A) . . . . .	L1: <b>1618 A</b> L2: <b>1637 A</b> L3: <b>1612 A</b>	—
	- power factor/time constant . . . . .	L1: <b>0,35</b> L2: <b>0,35</b> L3: <b>0,35</b>	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage $U/U_e = 1,05$ (V) . . . . .	L1: <b>532 V</b> L2: <b>531 V</b> L3: <b>529 V</b>	—
	- test current $I/I_e =$ (A) . . . . .	L1: <b>1298 A</b> L2: <b>1301 A</b> L3: <b>1295 A</b>	—
	- power factor . . . . .	L1: <b>0,30</b> L2: <b>0,30</b> L3: <b>0,30</b>	—
	transient recovery voltage (V) . . . . .	L1: <b>532 V</b> L2: <b>531 V</b> L3: <b>529 V</b>	—
	current duration (ms) . . . . .	<b>120 ms</b>	—
	time interval between operations . . . . .	<b>30 s</b>	—
	Number of make/break or make and break operations . . . . .	<b>3 x make/break operation</b>	<b>P</b>
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz) . . . . .	<b>58,1 kHz</b>	—
	Measured oscillatory frequency (kHz) . . . . .	L1: <b>58,5 kHz</b> L2: <b>58,7 kHz</b> L3: <b>57,5 kHz</b>	<b>P</b>
	Factor $\gamma$ . . . . .	L1: <b>1,11</b> L2: <b>1,10</b> L3: <b>1,11</b>	<b>P</b>



IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		<i>P</i>
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		<i>P</i>
8.3.3.4	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) . . . . . :	<b>1500 V</b>	—
	No flashover or breakdown		<i>P</i>
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA . . . . . :		<i>N</i>
	Leakage current (other utilization categories) ≤ 2 mA) . . . . . :	<b>&lt; 5 μA</b>	<i>P</i>
	test voltage (1,1 Ue) (V) . . . . . :	<b>759 V</b>	—
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K . . . . . :	<b>36 K - 46 K</b>	<i>P</i>
	conductor cross-sectional area (mm <sup>2</sup> ) . . . . . :	<b>70 mm<sup>2</sup></b>	—
	test current Ie (A) . . . . . :	<b>160 A</b>	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.) . . . . . :	<b>d</b>	—
	actuating force for opening (N) . . . . . :	<b>82 N</b>	—
	test force with blocked main contacts (N) . . . :	<b>246 N</b>	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts . . . . . :		<i>P</i>
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		<i>P</i>

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY		
8.3.4.1	Operational performance test		
	utilization category . . . . .	<b>AC-23A</b>	—
	rated operational voltage (V) . . . . .	<b>500 V</b>	—
	rated operational current (A) . . . . .	<b>160 A</b>	—
	Test conditions electrical operation cycles:		
	test voltage (V) . . . . .	L1: <b>505 V</b> L2: <b>516 V</b> L3: <b>518 V</b>	—
	test current (A) . . . . .	L1: <b>168 A</b> L2: <b>169 A</b> L3: <b>168 A</b>	—
	power factor/time constant . . . . .	L1: <b>0,62</b> L2: <b>0,62</b> L3: <b>0,62</b>	—
	Number of cycles with current . . . . .	<b>1000</b>	<b>P</b>
	Number of cycles without current . . . . .	<b>7000</b>	<b>P</b>
	First test sequence (with/without current) . . .	<b>with current</b>	—
	Second test sequence (with/without current) :	<b>without current</b>	—
	time interval between first and second test sequence . . . . .	<b>1 hour</b>	—
8.3.4.2	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) . . . . .	<b>1500 V</b>	—
	No breakdown or flashover		<b>P</b>
8.3.4.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA . . . . .		<b>N</b>
	Leakage current (other utilization categories) ≤ 2 mA . . . . .	<b>&lt; 5 μA</b>	<b>P</b>
	test voltage (1,1 Ue) (V) . . . . .	<b>550 V</b>	—
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K . . . . .	<b>46 K - 58 K</b>	<b>P</b>
	conductor cross-sectional area (mm <sup>2</sup> ) . . . . .	<b>70 mm<sup>2</sup></b>	—
	test current I <sub>e</sub> (A) . . . . .	<b>160 A</b>	—

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
8.3.5	TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY		
8.3.5.1	Short-time withstand current test		
	Rated short-time withstand current I <sub>cw</sub> (A) . . . . .		
	test voltage (V) . . . . .	L1: L2: L3:	—
	r.m.s. test current (A) . . . . .	L1: L2: L3:	—
	peak test current (A) . . . . .	L1: L2: L3:	—
	power factor/time constant . . . . .	L1: L2: L3:	—
	test duration (s) . . . . .		—
	Equivalent with . . . . .		
8.3.5.1.5	Behaviour of the equipment during the test		
8.3.5.1.6	Conditions of the equipment after the test		
8.3.5.2	Short-circuit making capacity		
	Rated short-circuit making capacity I <sub>cm</sub> (A) . . . . .		
	test voltage (V) . . . . .	L1: L2: L3:	—
	r.m.s. test current (A) . . . . .	L1: L2: L3:	—
	peak test current (A) . . . . .	L1: L2: L3:	—
	power factor/time constant . . . . .	L1: L2: L3:	—
	current duration (s) . . . . .		—
	number of making cycles . . . . .		—
8.3.5.2.5	Behaviour of the equipment during the test		
8.3.5.2.6	Conditions of the equipment after the test		
8.3.5.3	Dielectric verification		
	test voltage (2 U <sub>i</sub> ) for 1 min (V) . . . . .		—

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
	No flashover or breakdown		
8.3.5.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA . . . . . :		
	Leakage current (other utilization categories) $\leq 2,0$ mA . . . . . :		
	test voltage (1,1 Ue) (V) . . . . . :		---
8.3.5.5	Temperature-rise verification		
	Temperature rise of main circuit terminals $\leq 80$ K . . . . . :		
	cross-sectional area (mm <sup>2</sup> ) . . . . . :		---
	test current Ie (A) . . . . . :		---

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IEC 947-3			
Cl.	Requirement – Test	Result	Verdict

8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		
	Protective device details:		<i>fuse-links</i>
	- manufacturer's name, trademark or identification mark . . . . . :	<i>Socomec</i>	---
	- manufacturer's model or type reference . . . . . :	<i>T. 0</i>	---
	- rated voltage (V) . . . . . :	<i>500 V</i>	---
	- rated current (A) . . . . . :	<i>160 A gG/gl</i>	---
	- rated breaking capacity (kA) . . . . . :	<i>120 kA</i>	---
8.3.6.2	Fuse protected short-circuit withstand		
	test voltage (1,05 Ue) (V) . . . . . :	L1: <i>423 V</i> L2: <i>423 V</i> L3: <i>423 V</i>	---
	test current (kA) . . . . . :	L1: <i>100,2 kA</i> L2: <i>113,5 kA</i> L3: <i>104,4 kA</i>	---
	rated frequency (Hz) . . . . . :	<i>50 Hz</i>	---
	power factor . . . . . :	<i>0,15</i>	---
	Fuse protected short-circuit withstand		<i>P</i>
	- max. let-through current (kA) . . . . . :	L1: - L2: <i>22,66 kA</i> L3: <i>21,00 kA</i>	---
	- Joule integral I <sup>2</sup> dt (A <sup>2</sup> s) . . . . . :	L1: - L2: <i>154 kA<sup>2</sup>s</i> L3: <i>129 kA<sup>2</sup>s</i>	---
	Fuse protected short-circuit making		
	- max. let-through current (kA) . . . . . :	L1: <i>18,55 kA</i> L2: <i>18,07 kA</i> L3: <i>2,73 kA</i>	---
	- Joule integral I <sup>2</sup> dt (A <sup>2</sup> s) . . . . . :	L1: <i>122 kA<sup>2</sup>s</i> L2: <i>112 kA<sup>2</sup>s</i> L3: <i>8 kA<sup>2</sup>s</i>	---
8.3.6.2.5	Behaviour of the equipment during the test		<i>P</i>
8.3.6.2.6	Conditions of the equipment after the test		<i>P</i>
8.3.6.3	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) . . . . . :	<i>1500 V</i>	---
	No flashover or breakdown		<i>P</i>
8.3.6.4	Leakage current		

IEC 947-3			
Cl.	Requirement – Test	Result	Verdict
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5 \text{ mA}$ . . . . . :		<i>N</i>
	Leakage current (other utilization categories) $\leq 2,0 \text{ mA}$ . . . . . :	$< 5 \mu\text{A}$	<i>P</i>
	test voltage (1,1 Ue) (V) . . . . . :	<b>440 V</b>	—
8.3.6.5	Temperature-rise verification		
	Temperature rise of main circuit terminals $\leq 80 \text{ K}$ . . . . . :	<b>33 K - 42 K</b>	<i>P</i>
	cross-sectional area (mm <sup>2</sup> ) . . . . . :	<b>70 mm<sup>2</sup></b>	—
	test current Ie (A) . . . . . :	<b>160 A</b>	—

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IEC 947-3			
Cl.	Requirement – Test	Result	Verdict

TABLE: temperature rise measurements			
temperature rise dT of part:	phase	dT (K)	required dT (K)
<i>upper terminal</i>	<i>L1</i>	<i>38</i>	<i>65</i>
	<i>L2</i>	<i>45</i>	<i>65</i>
	<i>L3</i>	<i>42</i>	<i>65</i>
<i>lower terminal</i>	<i>L1</i>	<i>34</i>	<i>65</i>
	<i>L2</i>	<i>35</i>	<i>65</i>
	<i>L3</i>	<i>39</i>	<i>65</i>
<i>upper knife-contact</i>	<i>L1</i>	<i>81</i>	<i>120</i>
	<i>L2</i>	<i>82</i>	<i>120</i>
	<i>L3</i>	<i>82</i>	<i>120</i>
<i>lower knife-contact</i>	<i>L1</i>	<i>70</i>	<i>120</i>
	<i>L2</i>	<i>69</i>	<i>120</i>
	<i>L3</i>	<i>68</i>	<i>120</i>

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## Remarks

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**Description of the types:**

*type: FUSERBLOC 0 160A S ; switch-disconnector-fuse, close and open position, 3 and 4-poles.*

*type: FUSERBLOC 0 160A ST; switch-disconnector-fuse, close, open and test position, 3 and 4-poles.*

**Additional test:**

*- Parts of insulation material necessary to retain current carrying parts were subjected to a glow-wire test according IEC 695-2-1, at 960 °C. Other insulation materials were subjected to a glow-wire test at 650 °C.*

*These test withstood well.*

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**TEST REPORT**


**EN 60 947-3**

**Low-voltage switchgear and controlgear**

**Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units**

**Report**

Reference No. .... : **2006101.57**  
 Tested by (+ signature) ..... : **H.L. Schendstok**  
 Approved by (+ signature) ..... : **L.J.W. van Megen**  
 Date of issue ..... : **2000-09-18**  
 Contents ..... : **4 pages**  
 .....

  
 .....  
 H. Harms van Dijk

This report is based on a blank test report that was prepared by KEMA using information obtained from the TRF originator (see below).

**Testing laboratory**

Name ..... : **KEMA Registered Quality B.V.**  
 Address ..... : **Utrechtseweg 310, 6812 AR Arnhem, The Netherlands**  
 Testing location ..... : **SOCOMEK S.A., 1-4, Route de Westhouse, 67230 BENFELD**  
**France**  
**All tests are observed by compiler**  
 .....

**Client**

Name ..... : **SOCOMEK S.A.**  
 Address ..... : **1-4, rue de Westhouse, 67230 BENFELD, France**  
 .....

**Test specification**

Standard ..... : **EN 60 947-3:92 + A1:95 + corrigendum:97 + A2:97**  
 Test procedure ..... : **CCA-scheme**  
 Procedure deviation ..... : **N.A.**  
 Non-standard test method ..... : **N.A.**  
 .....

**Test Report Form/blank test report**

Test Report Form No. .... : **60947-3B/98-09**  
 TRF originator ..... : **KEMA**  
 Master TRF ..... : **dated 98-05**

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**Test item**

Description ..... : **Switch-disconnector-fuse**  
 Trademark ..... : **SOCOMEK**  
 Model and/or type reference ..... : **FUSERBLOC 0 160A**  
 Manufacturer ..... : **SOCOMEK S.A.**

Rating(s) ..... : **AC-23A**  
**500 V 160 A**  
**Ui 750 Vac , Ith 160 A**

**Particulars: test item vs. test requirements**

- method of operation ..... : **Independent manual operation**
- switching positions ..... : **2 (On and Off)**
- number of poles ..... : **3-poles and 4-poles**
- kind of current ..... : **AC**
- number of phases ..... : **3**
- rated frequency (Hz) ..... : **50/60 Hz**
- number of positions of the main contacts ..... : **2 (On and Off)**

**Rated and limiting values, main circuit** .....

- rated operational voltage  $U_e$  (V) ..... : **500 V**
- rated insulation voltage  $U_i$  (V) ..... : **750 V**
- rated impulse withstand voltage  $U_{imp}$  (kV) ..... : **8 kV**
- conventional free air thermal current  $I_{th}$  (A) ..... : **160 A**
- conventional enclosed thermal current  $I_{the}$  (A) .. : -
- rated operational current  $I_e$  (A) ..... : **AC-23A**  
**500 V 160 A**
- rated uninterrupted current  $I_u$  (A) ..... : **160 A**
- utilization category ..... : **AC-23A**

**Short-circuit characteristic** .....

- rated short-time withstand current  $I_{cw}$  (kA) ..... : -
- rated short-time making capacity  $I_{cm}$  (kA) ..... : -
- rated conditional short-circuit current ..... : **100 kA at 400V**

**Rated and limiting values, auxiliary circuits** ..... : **N**

- rated operational voltage (V) .....
- rated frequency (Hz) .....
- number of circuits .....
- number and kind of contact elements .....

**Co-ordination of short-circuit protective devices** ..

- kind of protective device ..... : **Fuse-links, 160A gG / gI, 500V, size 0**

**Test case verdicts**

- Test case does not apply to the test object ..... : N(.A.)
- Test item does meet the requirement ..... : P(ass)
- Test item does not meet the requirement ..... : F(ail)

**Testing**

Date of receipt of test item ..... : 98-07

Date(s) of performance of test ..... : 98-07

..... :

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EN 60 947-3			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		
8.3.7.1	Overload test		
	Ambient temperature 10-40 °C .....	26°C	—
	Test enclosure W x H x D (mm x mm x mm) ..		—
	material of enclosure .....		—
	test current 1,6 Ithe or 1,6 Ith (A) .....	256 A	—
	cable/busbar cross-section (mm <sup>2</sup> ) / (mm) .....	70 mm <sup>2</sup>	—
	Fuse-link details:		
	- manufacturer's name, trademark or identification mark .....	SOCOMEK	—
	- rated current (A) .....	160 A – gG / gI – size 0	—
	- power loss (W) .....	15 W	—
	- rated breaking capacity (kA) .....	120 kA	—
	- time duration of the overload test (s) .....	1 500 s	—
	Within 3 min after the fuse(s) has(have) operated (or 1 h), the equipment shall be operated once, i.e. opened and closed		P
	The equipment shall not have undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) .....	1 500 V	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....		N
	Leakage current (other utilization categories) ≤ 2 mA) .....	< 0,2 mA	P
	test voltage (1,1·Ue) (V) .....	550 V, on request of manufacturer tested with 759 V	—
8.3.7.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K (K) .....	33 K – 44 K	P
	cross-sectional area (mm <sup>2</sup> ) .....	70 mm <sup>2</sup>	—
	test current Ie (A) .....	160 A	—