

TEST REPORT

EN 60 947-3

Low-voltage switchgear and controlgear

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

Report

Reference No. : **98.4418.52**

Tested by (+ signature) : **H.L. Schendstok**

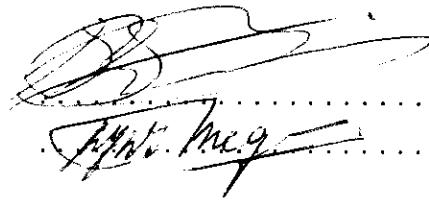
Approved by (+ signature) . . . : **L.J.W. van Megen**

Date of issue : **2000-03-01**

Contents : 24 pages

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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 : **Socomec S.A., 1-4, Route de Westhouse, 67230 Benfeld, France**

All tests are observed by compiler

. :

Client

Name : **Socomec S.A.**

Address : **1-4, Route 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 : **SOCOME C**

Model and/or type reference . . . : **FUSERBLOC CD 32A 14x51 (description see page 24)**

Manufacturer : **SOCOME C S.A.**

Test item does not meet the requirement : F(fail)

..... :

Testing

Date of receipt of test item : **98-11**

Date(s) of performance of test : **98-12 / 99-01**

..... :

General remarks

"This report is not valid as a CB Test Report unless appended to a CB Test Certificate issued by a NCB, in accordance with IECEE O2".

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

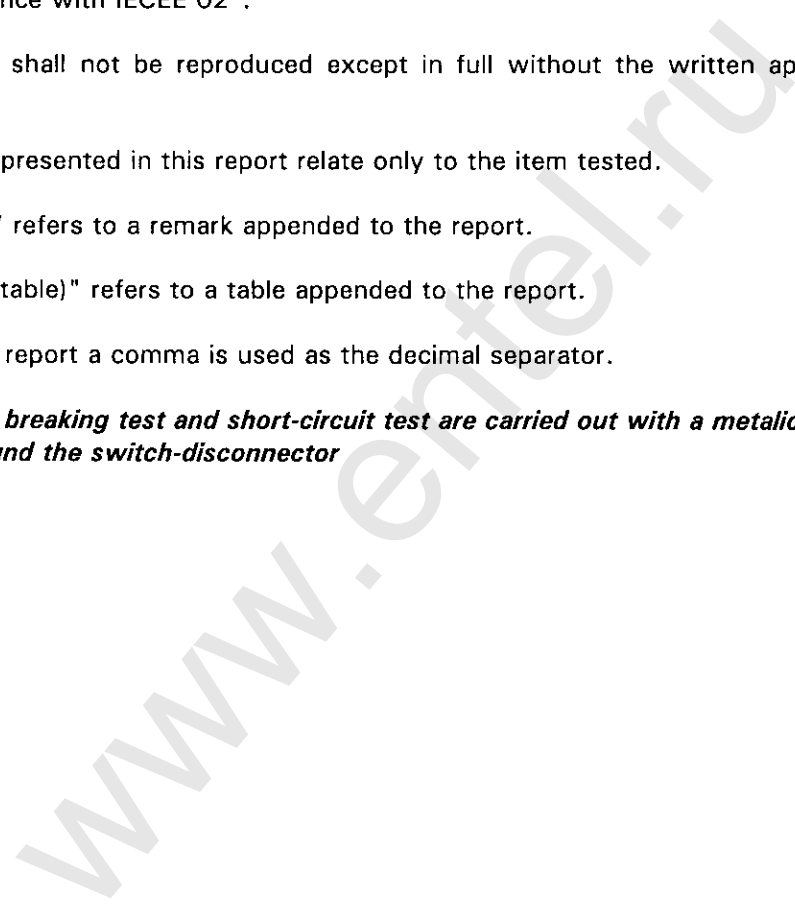
The test results presented in this report relate only to the item tested.

"(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.

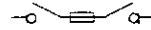
The making and breaking test and short-circuit test are carried out with a metallic screen placed at 100 mm all around the switch-disconnector



Copy of marking plate

SOCOMECH**FUSERBLOC CD 32A 14x51**

Switch disconnecter fuse



14x51 32A

P=3,3W

I.E.C 947-3 AC23A le 32A 690V 50/60Hz

Made in France



EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
5.2	MARKING		
	Marking on equipment itself or on nameplate or nameplates attached to the equipment and legible from the front after mounting		
	- indication of the open and closed position	<i>I O</i>	<i>P</i>
	- suitability for isolation		<i>P</i>
	- disconnectors 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 CD 32A 14x51</i>	<i>P</i>
	- rated operational current	<i>AC-23A</i> <i>690 V 32 A</i>	<i>P</i>
	- rated operational voltage	<i>690 V</i>	<i>P</i>
	- utilization category	<i>AC-23A</i>	<i>P</i>
	- rated frequency	<i>50/60 Hz</i>	<i>P</i>
	- manufacturer's claim for compliance with EN 60 947-3	<i>IEC 947-3</i>	<i>P</i>
	- degree of protection		<i>N</i>
	Marking on fuse-combination units:		
	- fuse type	<i>14x51</i>	<i>P</i>
	- maximum rated current	<i>32 A</i>	<i>P</i>
	- power loss of the fuse-link	<i>3,3 W</i>	<i>P</i>
	Identification of terminals:		
	- line terminals	<i>immaterial (1L1, 3L2, 5L3)</i>	<i>P</i>
	- load terminals	<i>immaterial (2T1, 4T2, 6T3)</i>	<i>P</i>
	- neutral pole terminal	<i>N</i>	<i>P</i>
	- protective earth terminal		<i>N</i>
	Data in the manufacturer's published information:		
	- rated insulation voltage	<i>800 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>

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	- rated short-time withstand current and duration		N
	- rated short-circuit making capacity		N
	- rated conditional short-circuit current	100 kA at 415 V	P

7.1	CONSTRUCTION		
7.1.2	Current-carrying parts and their connection	<i>no contact pressure through insulation material</i>	P
7.1.3	Clearances		
	Rated impulse withstand voltage	(see test sequence I)	P
	Creepage distances		
	Pollution degree	3	—
	Comparative tracking index (V)	400 V	—
	Material group	II	—
	Rated insulation voltage U_i (V)	800 V	—
	Minimum creepage distances (mm)	11 mm	—
	Measured creepage distances (mm)	11,5 mm	P
	In case U_{imp} is not indicated		N
7.1.4	Actuator		
7.1.4.1	Insulation	<i>thermoplastic material</i>	P
7.1.4.2	Direction of movement	<i>(IEC 447)</i>	P
7.1.5	Indication of contact position		
7.1.5.1	Indicating means	<i>by actuator and indication device</i>	P
7.1.5.2	Indication by the actuator	<i>I on, O off</i>	P
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		P
	- indication of the position of the contacts		P
	- construction of the actuating mechanism		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm)	8 mm	—
	- measured clearances (mm)	23 mm	P
	- test U_{imp} across gap (kV)	12,1 kV (200 m)	P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N
	minimum time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles (ms) :		—
	measured time interval (ms) :		—
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		P
	test force F applied to the actuator in an attempt to operate to the closed position (N) :	68 N	—
	rated impulse withstand voltage (kV) :	8 kV	—
	test Uimp on open main contacts at the test force	12,1 kV (200 m)	P
7.1.7	Terminals		
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)	P
	Terminal connections shall be such that necessary contact pressure is maintained	(see 8.2.4 below)	P
	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)	P
	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)	P
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm ²) :	16 mm² stranded	—
	diameter of thread (mm) :	M5	—

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Clause	Requirement – Test	Result - Remark	Verdict
	torque (Nm) :	3 x 110 % = 3,3 Nm	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm ²) :	1,5 mm² rigid and flexible with ferrule	—
	number of conductor of the smallest cross section :	1	—
	diameter of bushing hole (mm) :	6,4 mm	—
	height between the equipment and the platen :	260 mm	—
	mass at the conductor(s) (kg) :	0,4 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	torque 2,0 Nm	P
	Pull-out test		
	force (N) :	40 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-sectional area (mm ²) :	16 mm² rigid and flexible with ferrule	—
	number of conductor of the largest cross section :	1	—
	diameter of bushing hole (mm) :	12,7 mm	—
	height between the equipment and the platen :	298 mm	—
	mass at the conductor(s) (kg) :	2,9 kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	torque 2,0 Nm	P
	Pull-out test		
	force (N) :	100 N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest and smallest cross-sectional area (mm ²) :		—
	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 :		—

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	mass at the conductor(s) (kg) :		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test		
	force (N) :		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
7.1.7.2	Connection capacity		
	type of conductors :	<i>rigid and flexible with ferrule</i>	—
	minimum cross-sectional area of conductor (mm ²) :	1,5 mm²	—
	maximum cross-sectional area of conductor (mm ²) :	16 mm²	—
	number of conductors simultaneously connectable to the terminal :	1	—
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor	N	P
	protective earth terminal		N
	other terminals	<i>immaterial (1L1, 2T1, 3L2, 4T2, 5L3, 6T3)</i>	P
7.1.8	Additional requirements for equipment provided with a neutral pole		
	Marking of neutral pole	N	P
	The switched neutral pole shall not break before and shall not make after the other poles		P
	Conventional thermal current of neutral pole	32 A	P
7.1.9	Provisions for protective earthing		
7.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
7.1.9.2	The protective earth terminal shall be readily accessible		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The protective earth terminal shall be suitably protected against corrosion		<i>P</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>P</i>
7.1.9.3	Protective earth terminal marking and identification		<i>P</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>
	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		

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Clause	Requirement – Test	Result - Remark	Verdict
	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		
	Degree of protection : IP		<i>N</i>

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Temperature-rise		
	ambient temperature 10-40 °C :	22 °C	—
	test enclosure W x H x D (mm x mm x mm) :		—
	material of enclosure :		—
	Main circuits, test conditions:		
	- conventional thermal current I _{th} (A) :	32 A	—
	- conventional enclosed thermal current I _{the} (A) :		—
	- cable/busbar cross-section (mm ²) / (mm) :	6 mm²	—
	Fuse-link details (fuse-combination units only):		
	- manufacturer's name, trademark or identification mark :	SOCOMEK	—
	- manufacturer's model or type reference :	14x51	—
	- rated current (A) :	gG 32 A	—
	- power loss (W) :	3,3 W	—
	- rated breaking capacity (kA) :	120 kA	—
	Temperature-rise	(see appended table)	<i>P</i>
	Auxiliary circuits: temperature rise of connecting terminals (K) :		<i>N</i>
	idem, requirement (K) :		—
	rated operation current (A) :		—
	cross-section (mm ²) :		—
8.3.3.2	Test of dielectric properties, impulse withstand voltage (U _{imp} indicated):		
	- rated impulse withstand voltage (kV) :	8 kV	—
	- test U _{imp} main circuits (kV) :	9,6 kV (200 m)	<i>P</i>
	- test U _{imp} auxiliary circuits (kV) :		<i>N</i>

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Clause	Requirement – Test	Result - Remark	Verdict
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,1 kV (200 m)	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :		–
	- main circuits, test voltage for 1 min (V) . . . :		N
	- control and auxiliary circuits, test voltage for 1 min (V) :		N

8.3.3.3	Making and breaking capacity switch-disconnector-fuse 3-poles		
	utilization category :	AC-23A	–
	rated operational voltage Ue (V) :	690 V	–
	rated operational current Ie (A) or power (kW) :	32 A	–
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V) :	L1: 729 V L2: 740 V L3: 738 V	–
	- test current I/Ie = (A) :	L1: 335,2 A L2: 334,1 A L3: 335,8 A	–
	- power factor/time constant :	L1: 0,45 L2: 0,45 L3: 0,45	–
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V) :	L1: 735 V L2: 743 V L3: 740 V	–
	- test current I/Ie = (A) :	L1: 271,1 A L2: 271,6 A L3: 271,4 A	–
	- power factor :	L1: 0,48 L2: 0,48 L3: 0,48	–
	transient recovery voltage (V) :	L1: 742 V L2: 747 V L3: 747 V	–
	current duration (ms) :	make: > 86,89 ms break: > 90,08 ms	–

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Clause	Requirement – Test	Result - Remark	Verdict
	time interval between operations :	30 s	—
	Number of make/break or make and break operations :	5 x make operations 5x break operations	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz) :	32,85 kHz	—
	Measured oscillatory frequency (kHz) :	L1: 32,4 kHz L2: 34,2 kHz L3: 32,6 kHz	P
	Factor γ :	L1: 1,08 L2: 1,10 L3: 1,09	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) :	1600 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA :		N
	Leakage current (other utilization categories) ≤ 2 mA) :	< 0,2 mA	P
	test voltage (1,1 Ue) (V) :	759 V	—
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K :	42 K - 58 K	P
	conductor cross-sectional area (mm ²) :	6 mm²	—
	test current Ie (A) :	32 A	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.) :	1c	—
	actuating force for opening (N) :	68 N	—
	test force with blocked main contacts (N) . . . :	200 N	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts :		P

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Clause	Requirement – Test	Result - Remark	Verdict
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.3.3	Making and breaking capacity <i>switch-disconnector-fuse phase-neutral</i>		
	utilization category	AC-23A	—
	rated operational voltage Ue (V)	420 V	—
	rated operational current Ie (A) or power (kW) :	32 A	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: L3: 427 V	—
	- test current I/Ie = (A)	L1: L2: L3: 328,4 A	—
	- power factor/time constant	L1: L2: L3: 0,49	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: L3: 427 V	—
	- test current I/Ie = (A)	L1: L2: L3: 265,6 A	—
	- power factor	L1: L2: L3: 0,49	—
	transient recovery voltage (V)	L1: L2: L3: 427 V	—
	current duration (ms)	make: > 63,11 ms break: > 70 ms	—
	time interval between operations	30 s	—
	Number of make/break or make and break operations	5 x make operations 5 x break operations	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz)	50,62 kHz	—

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Clause	Requirement – Test	Result - Remark	Verdict
	Measured oscillatory frequency (kHz) :	L1: L2: L3: 47,3 kHz	P
	Factor γ :	L1: L2: L3: 1,05	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) :	1600 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA :		N
	Leakage current (other utilization categories) ≤ 2 mA) :	< 0,2 mA	P
	test voltage (1,1 Ue) (V) :	759 V	—
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K :	24 K - 41 K	P
	conductor cross-sectional area (mm ²) :	6 mm²	—
	test current Ie (A) :	32 A	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.) :	1c	—
	actuating force for opening (N) :	68 N	—
	test force with blocked main contacts (N) . . . :	200 N	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts :		P
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY <i>switch-disconnector-fuse 3-poles</i>		
8.3.4.1	Operational performance test		
	utilization category	AC-23A	—
	rated operational voltage (V)	690 V	—
	rated operational current (A)	32 A	—
	Test conditions electrical operation cycles:		
	test voltage (V)	L1: 700 V L2: 710 V L3: 705 V	—
	test current (A)	L1: 33,5 A L2: 33,3 A L3: 33,8 A	—
	power factor/time constant	L1: 0,61 L2: 0,61 L3: 0,61	—
	Number of cycles with current	1500	
	Number of cycles without current	8500	P
	First test sequence (with/without current) . . .	electrical	—
	Second test sequence (with/without current) :	mechanical	—
	time interval between first and second test sequence	1 hour	—
8.3.4.2	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	1600 V	—
	No breakdown or flashover		P
8.3.4.3	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)	759 V	—
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	61 K - 75 K	P
	conductor cross-sectional area (mm ²)	6 mm²	—

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Clause	Requirement – Test	Result - Remark	Verdict
	test current I_e (A)	32 A	—

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_{cw} (A)		N
	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		N
8.3.5.1.5	Behaviour of the equipment during the test		N
8.3.5.1.6	Conditions of the equipment after the test		N
8.3.5.2	Short-circuit making capacity		
	Rated short-circuit making capacity I_{cm} (A)		N
	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		N
8.3.5.2.6	Conditions of the equipment after the test		N

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.5.3	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) :		—
	No flashover or breakdown		N
8.3.5.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA :		N
	Leakage current (other utilization categories) ≤ 2,0 mA :		N
	test voltage (1,1 Ue) (V) :		—
8.3.5.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K :		N
	cross-sectional area (mm ²) :		—
	test current Ie (A) :		—

8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		
	switch-disconnector-fuse 3-poles		
	Protective device details:		
	- manufacturer's name, trademark or identification mark :	SOCOMEC	—
	- manufacturer's model or type reference . . . :	gG 14x51	—
	- rated voltage (V) :	500 V ac	—
	- rated current (A) :	32 A	—
	- rated breaking capacity (kA) :	120 kA	—
8.3.6.2	Fuse protected short-circuit withstand		
	test voltage (1,05 Ue) (V) :	L1: 485 V L2: 485 V L3: 485 V	—
	test current (kA) :	L1: 101454 A L2: 107392 A L3: 100864 A	—
	rated frequency (Hz) :	50 Hz	—
	power factor :	0,08	—
	Fuse protected short-circuit withstand		

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Clause	Requirement – Test	Result - Remark	Verdict
	- max. let-through current (kA) :	L1: 330 A L2: 3520 A L3: 2430 A	—
	- Joule integral I ² dt (A ² s) :	L1: 60 A²s L2: 2110 A²s L3: 1630 A²s	—
	Fuse protected short-circuit making		
	- mean velocity of 15 manually under no-load conditions operations (m/s) :		—
	- point at which the measurement is made :		—
	- test speed during the fuse protected short-circuit making (m/s) :		—
	- max. let-through current (kA) :	L1: 2690 A L2: 2380 A L3: 4600 A	—
	- Joule integral I ² dt (A ² s) :	L1: 1590 A²s L2: 2280 A²s L3: 3370 A²s	—
8.3.6.2.5	Behaviour of the equipment during the test		P
8.3.6.2.6	Conditions of the equipment after the test		P
8.3.6.3	Dielectric verification		
	test voltage (2 Ui) for 1 min (V) :	1600 V	—
	No flashover or breakdown		P
8.3.6.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA :		N
	Leakage current (other utilization categories) ≤ 2,0 mA :	< 5 μA	P
	test voltage (1,1 Ue) (V) :	457 V	—
8.3.6.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K :	40 K - 53 K	P
	cross-sectional area (mm ²) :	6 mm²	—
	test current Ie (A) :	32 A	—

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT <i>switch-disconnector-fuse phase-neutral on 60% of the 3 phase conditional short-circuit current. Due to the fact of the circuit of the test laboratory, which has not a neutral</i>		
	Protective device details:		
	- manufacturer's name, trademark or identification mark :	SOCOMEK	—
	- manufacturer's model or type reference . . . :	gG 14x51	—
	- rated voltage (V) :	500 V ac	—
	- rated current (A) :	32 A	—
	- rated breaking capacity (kA) :	120 kA	—
8.3.6.2	Fuse protected short-circuit withstand		
	test voltage (1,05 Ue) (V) :	L1: L2: L3: 252 V	—
	test current (kA) :	L1: L2: L3: 63666 A	—
	rated frequency (Hz) :	50 Hz	—
	power factor :	0,17	—
	Fuse protected short-circuit withstand		
	- max. let-through current (kA) :	L1: L2: L3: 2050 A	—
	- Joule integral I ² dt (A ² s) :	L1: L2: L3: 1380 A²s	—
	Fuse protected short-circuit making		
	- mean velocity of 15 manually under no-load conditions operations (m/s) :		—
	- point at which the measurement is made . . . :		—
	- test speed during the fuse protected short-circuit making (m/s) :		—
	- max. let-through current (kA) :	L1: L2: L3: 2590 A	—
	- Joule integral I ² dt (A ² s) :	L1: L2: L3: 1520 A²s	—

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Clause	Requirement – Test	Result - Remark	Verdict
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) :	1600 V	—
	No flashover or breakdown		<i>P</i>
8.3.6.4	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) ≤ 2,0 mA :	< 0,2 mA	<i>P</i>
	test voltage (1,1 Ue) (V) :	457 V	—
8.3.6.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K :	39 K - 52 K	<i>P</i>
	cross-sectional area (mm ²) :	6 mm²	—
	test current Ie (A) :	32 A	—

8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		
8.3.7.1	Overload test		
	ambient temperature 10-40 °C :	20 °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) :	51,2 A	—
	cable/busbar cross-section (mm ²) / (mm) . . . :	6 mm²	—
	Fuse-link details:		
	- manufacturer's name, trademark or identification mark :	SOCOMEK	—
	- rated current (A) :	32 A gG 14x51	—
	- power loss (W) :	3,3 W	—
	- rated breaking capacity (kA) :	120 kA	—
	- time duration of the overload test (s) :	1980 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		<i>P</i>

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Clause	Requirement – Test	Result - Remark	Verdict
	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) :	1600 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) :	759 V	—
8.3.7.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K (K) :	43 K - 61 K	P
	cross-sectional area (mm ²) :	6 mm²	—
	test current Ie (A) :	32 A	—

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	TABLE: temperature rise measurements <i>switch-disconnector-fuse 3-poles</i>		
temperature rise dT of part:	phase	dT (K)	required dT (K)
<i>upper terminal</i>	<i>L1</i>	<i>48</i>	<i>65</i>
	<i>L2</i>	<i>55</i>	<i>65</i>
	<i>L3</i>	<i>49</i>	<i>65</i>
<i>upper fuse clip</i>	<i>L1</i>	<i>77</i>	<i>103</i>
	<i>L2</i>	<i>85</i>	<i>103</i>
	<i>L3</i>	<i>81</i>	<i>103</i>
<i>lower fuse clip</i>	<i>L1</i>	<i>71</i>	<i>103</i>
	<i>L2</i>	<i>76</i>	<i>103</i>
	<i>L3</i>	<i>70</i>	<i>103</i>
<i>lower terminal</i>	<i>L1</i>	<i>44</i>	<i>65</i>
	<i>L2</i>	<i>47</i>	<i>65</i>
	<i>L3</i>	<i>42</i>	<i>65</i>
<i>actuator (non metallic)</i>		<i>7</i>	<i>25</i>
<i>part which need not to be touched (non metallic)</i>		<i>16</i>	<i>50</i>

TABLE: temperature rise measurements <i>switch-disconnector-fuse phase-neutral</i>			
temperature rise dT of part:	phase	dT (K)	required dT (K)
<i>upper terminal</i>	<i>L3</i>	<i>39</i>	<i>65</i>
	<i>N</i>	<i>20</i>	<i>65</i>
<i>upper fuse clip</i>	<i>L3</i>	<i>62</i>	<i>103</i>
	<i>N</i>	<i>-</i>	
<i>lower fuse clip</i>	<i>L3</i>	<i>59</i>	<i>103</i>
	<i>N</i>		
<i>lower terminal</i>	<i>L3</i>	<i>35</i>	<i>65</i>
	<i>N</i>	<i>21</i>	<i>65</i>
<i>actuator (non metallic)</i>		<i>8</i>	<i>25</i>
<i>part which need not to be touched (non metallic)</i>		<i>18</i>	<i>50</i>

Remarks

Additional test:

- Parts of insulation material necessary to retain current carrying parts were subjected to a glow-wire test according EN 60947-1, at 960 °C.

This test withstood well.

description:

Type FUSEBLOC CD 32A 14x51: switch-disconnector-fuse for rear mounting by top hat rail 35 mm (EN 50022), 3-poles, 3-poles with switch neutral or 3-poles with disconnect solid neutral

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