



CB TEST CERTIFICATE

Ref. Certificate No.

NL-20650/A1

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Issued by:	DEKRA Certification B.V.		
Product:	Rotary switch disconnecter		
Applicant:	Santon International B.V.	Hekendorpstraat 69 3079 DX ROTTERDAM	The Netherlands
Manufacturer:	Santon International B.V.	Hekendorpstraat 69 3079 DX ROTTERDAM	The Netherlands
Factory:	Santon Holland B.V.	Berkenwoudestraat 4-6 3079 JA ROTTERDAM	The Netherlands
Rating and principal characteristics:	Rotary switch disconnecter with 4 positions 90°, both directions, DC-21B, Ue: 1000 V, Ui 1000 V, Uimp 8 kV, Icw 500 A - 1 s, Icm 500 A, maximum 10 poles. For further information see annex.		
Trade mark (if any):	SANTON		
Model/Type reference:	XA100.16..., XA100.10...		
Additional information:			
Sample of product tested to be in conformity with IEC:	60947-3(ed.3)		
Test Report Ref. No:	2143635.52		

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

Signed by: F.S. Strikwerda

Date of issue: 2011-06-07



DEKRA Certification is
former KEMA Quality

Ratings and principal characteristics:

Rotary switch disconnecter with 4 positions 90°, both directions, maximum 10 poles, contact composition during the tests 1 contact in series in the '+' pole and 1 contact in the '-' pole.

IP20 or IP65 when build-in an enclosure with gland of the shaft for panel mounting.

Method of mounting: Front: single hole mounting; bottom: screw mounting and/or top-hat rail mounting.

General:

Ratings: DC-21B, Ue 1000 V

Ie 16 A for XA100.16..., 10 A for XA100.10...

Ui 1000 V, Uimp 8 kV

Icw 500 A - 1 s, Icm 500 A

For ambient temperature: -5 °C to 70 °C.





Test Report issued under the responsibility of:



TEST REPORT IEC 60947-3 Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	
Report Reference No	2143635.52
Date of issue	4 May 2011
Total number of pages	36
CB Testing Laboratory	DEKRA Certification B.V.
Address	Utrechtseweg 310, 6812 AR Arnhem, the Netherlands
Applicant's name	Santon International B.V.
Address	Hekendorpstraat 69, 3079 DX Rotterdam, the Netherlands
Test specification:	
Standard	IEC 60947-3: 3 rd Edition (2008) in conjunction with IEC 60947-1: 5 th Edition (2007)
Test procedure	CB
Non-standard test method	N/A
Test Report Form No.	IECEN60947_3B
Test Report Form(s) Originator	OVE
Master TRF	Dated 2009-08
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Test item description	Rotary switch-disconnector
Trade Mark	Santon
Manufacturer	Santon International B.V., Hekendorpstraat 69, 3079 DX Rotterdam, the Netherlands
Model/Type reference	XA100.16..., XA100.10...

Ratings	Rotary switch-disconnector with 4 positions 90°, both directions, DC-21B, Ie 16 A for XA100.16..., 10A for XA100.10..., Ue 1000 V, Ui 1000 V, Icw 500 A, Icm 500 A, Uimp 8 kV, maximum 10 poles (one pole is one contact, 2 poles switching per circuit).
	<p>General:</p> <ul style="list-style-type: none">- IP20 or IP65 when mounted in an enclosure with gland of the shaft for panel mounting- Method of mounting: front: single hole mounting; bottom: screw mounting and or top-hat rail mounting

Modified page dated 7-6-2011

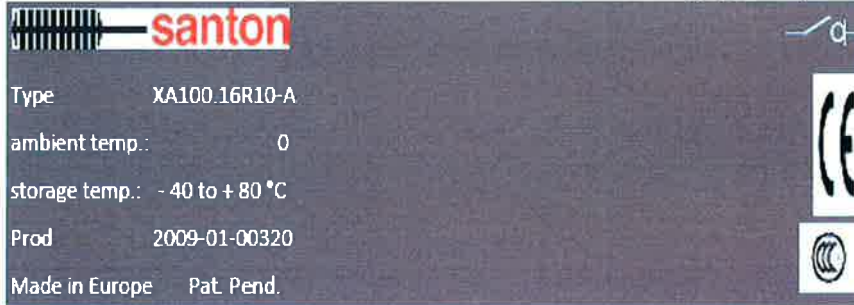
Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB Testing Laboratory:	DEKRA Certification B.V.
Testing location/ address	Utrechtseweg 310, 6812 AR Arnhem, the Netherlands
<input type="checkbox"/> Associated CB Test Laboratory:	
Testing location/ address	
Tested by (name + signature)	M.T.H. van Gemen 
Approved by (+ signature)	H.L. Schendstok 
<input type="checkbox"/> Testing procedure: TMP	
Testing location/ address	
Tested by (name + signature)	
Approved by (+ signature)	
<input type="checkbox"/> Testing procedure: WMT	
Testing location/ address	
Tested by (name + signature)	
Witnessed by (+ signature)	
Approved by (+ signature)	
<input type="checkbox"/> Testing procedure: SMT	
Testing location/ address	
Tested by (name + signature)	
Approved by (+ signature)	
Supervised by (+ signature)	
<input type="checkbox"/> Testing procedure: RMT	
Testing location/ address	
Tested by (name + signature)	
Approved by (+ signature)	
Supervised by (+ signature)	

Summary of testing:	
Tests performed (name of test and test clause): Test sequence I, II, III Notes: 1. Composition of the contacts during the tests: 1 contact in '+' pole and 1 contact in '-' pole. 2. For checking the service condition -5 °C to +70 °C tests of Sequence I and II are carried out at +70 °C 3. Test performed on type XA100.16... can cover the tests on type with XA100.10... since the construction, materials, design are fully identical except the ratings on marking plate.	Testing location: DEKRA Certification B.V. Arnhem, the Netherlands
Summary of compliance with National Differences: N/A	

Copy of marking plate:

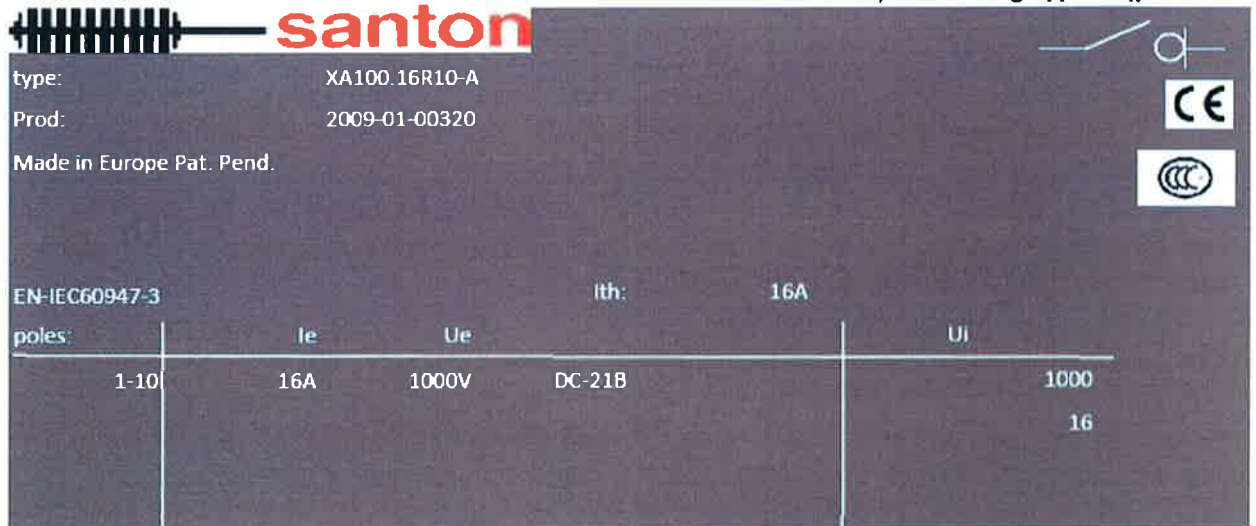
For example:

Labels for IEC and CCC certified switches with mounting types B, P and D



EN-IEC60947-3		lth: 16A		PLDGR 2	
poles:	Ie	Ue		Ui	
1-10	16A	1000V	DC-21B	1000	1000

Labels for IEC and CCC certified switches with Reverse contacts, mounting type R (printed



EN-IEC60947-3		lth: 16A			
poles:	Ie	Ue		Ui	
1-10	16A	1000V	DC-21B	1000	16

Type designation and technical details:

See page 29 and 30

Test item particulars:	
- method of operation	: Independent operation
- suitability for isolation	: suitable
- degree of protection	: IP20 (handle/shaft IP65, when enclosure is equal or more than IP65)
- number of poles.....	: Maximum 10 poles (one pole is one contact, 2 poles switching per circuit)
- kind of current.....	: dc
- number of positions of the main contacts.....	: 4
Rated and limiting values, main circuit..... :	
- rated operational voltage Ue (V).....	: 1000 Vdc
- rated insulation voltage Ui (V).....	: 1000 V
- rated impulse withstand voltage Uimp (kV).....	: 8 kV
- conventional free air thermal current Ith (A).....	: 16 A for XA100.16..., 10 A for XA100.10...
- conventional enclosed thermal current Ithe (A).....	: N/A
- rated operational current Ie (A).....	: 16 A for XA100.16..., 10 A for XA100.10...
- rated uninterrupted current Iu (A).....	: 16 A for XA100.16..., 10 A for XA100.10...
- rated frequency (Hz).....	: -
- utilization category.....	: DC-21B
Short-circuit characteristic..... :	
- rated short-time withstand current Icw (kA).....	: 500 A – 1 s
- rated short-time making capacity Icm (kA).....	: 500 A
- rated conditional short-circuit current.....	: N/A
Control circuits..... : N/A.	
Auxiliary circuits..... : N/A	
Relays and releases..... :	
Co-ordination of short-circuit protective devices..... :	
- kind of protective device.....	: N/A.
Possible test case verdicts:	
- test case does not apply to the test object	: N/A
- test object does meet the requirement	: P (Pass)
- test object does not meet the requirement	: F (Fail)
Testing	
Date of receipt of test item	: April 2011
Date (s) of performance of tests.....	: April 2011

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(see Enclosure #)" refers to additional information appended to the report.

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

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

General product information:

Product: Rotary switch-disconnector for solar application

The service conditions of the switch-disconnector are:
-5 °C to +70 °C for utilization category DC-21B

Information in detail see description on page 29 and 30

Factory:

Santon Holland B.V.
Berkenwoudestraat 4-6, 3079 DX Rotterdam, The Netherlands

IEC 60947-3			
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	O, I	P
	- suitability for isolation		P
	- disconnectors AC-20 and DC-20 only: marked "Do not operate under load"		N/A
	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	SANTON	P
	- type designation or serial number	XA100.16R10-A	P
	- rated operational current	16 A	P
	- rated operational voltage	850 Vdc	P
	- utilization category	DC-21B	P
	- rated frequency		N/A
	- manufacturer's claim for compliance with IEC/EN 60947-3		P
	- degree of protection		N/A
	Marking on fuse-combination units:		N/A
	- fuse type		N/A
	- maximum rated current		N/A
	- power loss of the fuse-link		N/A
	Identification of terminals:		P
	- line terminals	DC: +1, +2, +3, +4, etc.	P
	- load terminals	DC: -1, -2, -3, -4, etc.	P
	- neutral pole terminal		N/A
	- protective earth terminal		N/A
	Data in the manufacturer's published information:		P
	- rated insulation voltage	1000 V	P
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	8 kV	P
	- pollution degree, if different from 3	3	P
	- rated duty	Uninterrupted duty	P

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated short-time withstand current and duration	Icw 500 A, 1 s	P
	- rated short-circuit making capacity	Icm 500 A	P
	- rated conditional short-circuit current		N/A
7.1	CONSTRUCTION AND PERFORMANCE REQUIREMENTS		P
7.1.2	Materials		P
7.1.2.2	Resistance to abnormal heat and fire		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11		—
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 960 °C		
	No visible flame and no sustained glowing		P
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C		
	No visible flame and no sustained glowing		P
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P
7.1.3 of part 1	Current-carrying parts and their connection		P
7.1.4	Clearances	Min 8 mm; measured $\geq 9,5$ mm, see appended table 7.1.3 on page 27	P
	Creepage distances	Min 12,5 mm; Measured ≥ 14 mm, see appended table 7.1.3 on page 27 For distance to bottom mounting plate, additionally empty layer plate placed	P
	Pollution degree	3	—
	Comparative tracking index (V)	$\geq 600V$	—
	Material group	I	—
7.1.5 of part 1	Actuator		P

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.5.1	Insulation		—
	Actuator insulated from live parts for		—
	- rated insulation voltage	Ui 1000 V	P
	- rated impulse withstand voltage	Uimp 8 kV	P
	Actuator made of metal		—
	- connected to a protective conductor or provided with an additional insulation		N/A
	Actuator made of or covered by insulating material.....		—
	- internal metal parts, which might become accessible in the event of an insulation failure, are also insulated from live parts for the rated insulation voltage		P
7.1.5.2	Direction of movement		P
	The direction of operation for actuators shall where applicable conform to IEC 60447		P
	There is no doubt of the “I” and “O” position and the direction of operation		P
7.1.6 of Part 1	Indication of contact position		P
7.1.6.1	Indicating means		NA
7.1.6.2	Indication by the actuator		P
7.1.7	Additional safety requirements for equipment suitable for isolation		P
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		P
	- marking according to 5.2.1b		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)		—
	- measured clearances (mm)	Min 8 mm, measured ≥ 9,5 mm	P
	- test Uimp across gap (kV)	14,8 kV	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		P

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Auxiliary switch is rated according to IEC 60947-5-1 (unless the equipment is rated AC-23)		N/A
	Time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles: ≥ 20 ms		—
	Measured time interval (ms)		N/A
	During the closing operation the contacts of the auxiliary switch closes after or simultaneously with the contacts of the main poles		N/A
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N/A
	The locking means is so designed that it cannot be removed with the appropriate padlock(s) installed		N/A
	Test force F applied to the actuator in an attempt to operate to the closed position (N)		N/A
	Rated impulse withstand voltage (kV)		N/A
	Test Uimp on open main contacts at the test force		
7.1.8 of Part 1	Terminals		P
7.1.7.1	All parts of terminals which maintain contact and carry current are of metal having adequate mechanical strength	(see 8.2.4 below)	P
	Terminal connections are such that necessary contact pressure is maintained	(see 8.2.4 below)	P
	Terminals are so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	(see 8.2.4 below)	P
	Terminals do 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 is not reduced below the rated value	(see 8.2.4 below)	P
8.2.4	Mechanical properties of terminals		P
	Mechanical strength of terminals		P
	Maximum cross-sectional area of conductor (mm ²)	2,5 mm ² flexible	—

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Clause	Requirement + Test	Result - Remark	Verdict

	Diameter of thread (mm)	3,9 mm	—
	Torque (Nm)	1,2	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		P
	Conductor of the smallest cross-sectional area (mm ²)	1,0 mm ² flexible	—
	Number of conductor of the smallest cross section	1	—
	Diameter of bushing hole (mm)	6,5 mm	—
	Height between the equipment and the platen ...	260 mm	—
	Mass at the conductor(s) (kg)	0,4	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	35 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest cross-sectional area (mm ²)	2,5 mm ² flexible	—
	Number of conductor of the largest cross section :	1	—
	Diameter of bushing hole (mm)	9,5	—
	Height between the equipment and the platen ...	280	—
	Mass at the conductor(s) (kg)	0,7	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	50	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest and smallest cross-sectional area (mm ²)		—
	Number of conductor of the smallest cross		—

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Clause	Requirement + Test	Result - Remark	Verdict
	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 neither slips out of the terminal nor breaks near the clamping unit		N/A
	Pull-out test		N/A
	Force (N), applied for 1 min.		—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		N/A
7.1.8.2	Connection capacity		P
	Type of conductors	flexible	—
	Minimum cross-sectional area of conductor (mm ²)	1,0 mm ²	—
	Maximum cross-sectional area of conductor (mm ²)	2,5 mm ²	—
	Number of conductors simultaneously connectable to the terminal	1	—
7.1.8.3	Connection		P
	Terminals for connection to external conductors are readily accessible during installation		P
	Clamping screws and nuts do not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		P
	Terminal intended exclusively for the neutral conductor		N/A
	Protective earth terminal		N/A
	Other terminals	DC:+1, +2, +3, +4, etc. DC:-1, -2, -3, -4, etc.	P
7.1.9	Additional requirements for equipment provided with a neutral pole		N/A
	Equipment provided with a pole intended for the connection of neutral, this pole shall be clearly marked by the letter "N"		---

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Clause	Requirement + Test	Result - Remark	Verdict
	The switched neutral pole does not break before and does not make after the other poles except		---
	- a pole having the appropriate short-circuit breaking and making capacity is used as neutral pole, all poles may operate together		---
	Conventional thermal current of neutral pole		---
7.1.10	Provisions for protective earthing		N/A
7.1.10.1	The exposed conductive parts are electrically interconnected and connected to a protective earth terminal		---
7.1.10.2	Protective earth terminal is readily accessible		---
	Protective earth terminal is suitably protected against corrosion		---
	Electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		---
	Protective earth terminal has no other functions		---
7.1.10.3	Protective earth terminal marking and identification		---
7.1.11	Enclosure for equipment		N/A
7.1.11.1	Design		N/A
	When the enclosure is opened, all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space is provided inside the enclosure		N/A
	The fixed parts of a metal enclosure are 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		N/A
	Under no circumstances a removable metal part of the enclosure is insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure are 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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means is provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it is not possible to remove the buttons from the outside of the enclosure		N/A
7.1.11.2	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 is securely fixed to the enclosure		N/A
7.1.11	Degree of protection of enclosed equipment		P
	Degree of protection	IP20 and IP65 when mounted in a enclosure of IP65 or higher	P
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		P
8.3.3.1	Temperature-rise		P
	ambient temperature 10-40 °C	21 °C	—
	test enclosure W x H x D (mm x mm x mm)	N/A	—
	material of enclosure	N/A	—
	Main circuits, test conditions:		—
	- conventional thermal current I _{th} (A)	16 A	—
	- conventional enclosed thermal current I _{the} (A) :	N/A	—
	- cable/busbar cross-section (mm ²) / length (mm) :	2,5 mm ² / 1 m	—
	Fuse-link details (fuse-combination units only):		—
	- manufacturer's name, trademark or identification mark	N/A	—
	- manufacturer's model or type reference	N/A	—
	- rated current (A)	N/A	—
	- power loss (W)	N/A	—
	- rated breaking capacity (kA)	N/A	—
	Measured temperature-rise	15 K - 17 K see appended table 8.3.3.1 on	P

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Clause	Requirement + Test	Result - Remark	Verdict
		page 27	
8.3.3.1	Temperature-rise		N/A
	ambient temperature 10-40 °C	: 71°C	
	test enclosure W x H x D (mm x mm x mm)	N/A	—
	material of enclosure	N/A	P
	Main circuits, test conditions:		P
	- conventional thermal current I _{th} (A)	: 16 A	P
	- conventional enclosed thermal current I _{the} (A) :	N/A	—
	- cable/busbar cross-section (mm ²) / length (mm):	2,5 mm ² / 1 m	P
	Fuse-link details (fuse-combination units only):		
	- manufacturer's name, trademark or identification mark	N/A	N/A
	- manufacturer's model or type reference	N/A	—
	- rated current (A)	N/A	—
	- power loss (W)	N/A	
	- rated breaking capacity (kA)		N/A
	Measured temperature-rise.....	15 K- 16 K see appended table 8.3.3.1 on page 27	—
8.3.3.2	Test of dielectric properties		
	Rated impulse withstand voltage (kV)	8 kV	—
	- test U _{imp} main circuits (kV)	9,8 kV	P
	- test U _{imp} auxiliary circuits (kV)		N/A
	- test U _{imp} on open main contacts (equipment suitable for isolation) (kV)	14,8 kV	P
	Power-frequency withstand voltage (V)		—
	- main circuits, test voltage for 5 sec. (V)	2200 V	P
	- control and auxiliary circuits, test voltage for 5 sec. (V)		N/A
	Devices, which have been disconnected for the power-frequency withstand voltage test.....		N/A
	Equipment suitable for isolation, leakage current not exceed 0,5 mA		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Test voltage 1,1 Ue (V)	1100 V	—
	Measured leakage current (mA).....	≤ 0,002 mA	P
8.3.3.3	Making and breaking capacity		P
	- utilization category	DC-21B	—
	- rated operational voltage Ue (V)	1000 V d.c.	—
	- rated operational current Ie (A) or power (kW) ..	16 A	—
	Fuse-link details (fuse-combination units only):		—
	- manufacturer's name, trademark or identification mark		—
	- manufacturer's model or type reference		—
	- rated current (A)		—
	- power loss (W)		—
	- rated breaking capacity (kA)		—
	Conditions for make/break operations or make operation, AC-23A and AC-23B only:		N/A
	- test current, I =x Ie (A):	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	Conditions for break operation, AC-23A and AC-23B only:		N/A
	- test voltage, U = 1,05 Ue(V):	L1: L2: L3:	—
	- test current, I =x Ie (A):	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	Conditions for make/break operations, other than AC-23A/B:		N/A
	- test voltage, U = 1,05 Ue(V):	L1: L2: L3:	—
	- test current, I =x Ie (A):	L1:	—

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Clause	Requirement + Test	Result - Remark	Verdict
		L2: L3:	
	- power factor/ time constant	L1: L2: L3:	—
	Number of make/break or make and break operations		N/A
	- recovery voltage duration (≥ 50 ms)		N/A
	- current duration (ms)		—
	- time interval between operations		N/A
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		N/A
	- oscillatory frequency (kHz)		—
	- measured oscillatory frequency (kHz)	L1: L2: L3:	
	- factor γ	L1: L2: L3:	
	Conditions for make/break operations or make operation, DC-21A and DC-21B only:		
	Ambient temperature	70 °C	
	- test voltage, $U = 1,05 U_e$	Required : 1050 Vdc Measured : 1053 Vdc	—
	- test current, $I = 1,5x I_e$	Required : 24,0 A Measured : 24,40 A	—
	- time constant (L/R time ($0,632 \times I$)).....	Required : 1,0 ms Measured : 1,007 ms	—
	Number of make/break or make and break operations	5	P
	- current duration (ms)	370 ms	—
	- recovery voltage duration (≥ 50 ms)		P
	- time interval between operations	30 s	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		
	Test performed without:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8	63 N	P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.3.4	Dielectric verification		
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~	2000 Vac	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	test voltage (1,1 U_e) (V)	1100 Vdc	—
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B): $\leq 0,5$ mA/pole ...		N/A
	Leakage current (other utilization categories): ≤ 2 mA/pole)	$\leq 0,02$ μ A	P
8.3.3.6	Temperature-rise verification		
	- conductor cross-section (mm ²)	2,5 mm ²	—
	- test current I_e (A)	16 A	—
	Ambient temperature	70 °C	
	Measured temperature-rise	15 K to 17 K see appended table 8.3.4.4 on page 28	P
8.3.3.7	Strength of actuator mechanism		
8.2.5	Verification of the strength of actuator mechanism and position indicating device		
	- actuator type (fig.)	Type c, 2 finger	—
8.2.5.2.1	Dependent and independent manual operation		

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Clause	Requirement + Test	Result - Remark	Verdict
	- actuating force for opening (N)	63 N	—
	- test force with blocked main contacts (N)	189 N	—
	- used method to keep the contact closed	welded	—
	During and after the test, open position not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied		N/A
8.2.5.2.2	Dependent power operation		N/A
	- main contacts fixed together in the closed position		—
	- used method to keep the contact closed		
	- 110% of the rated supply voltage applied to the equipment (3 times).....		—
	During and after the test, open position not indicated		—
	Equipment show no damage impairing its normal operation		—
	Equipment with locking mean, no locking in the open position while test force is applied		
8.2.5.2.3	Independent power operation		N/A
	- main contacts fixed together in the closed position		
	- used method to keep the contact closed		
	- stored energy of the power operator released (3 times)		
	During and after the test, open position not indicated		
	Equipment show no damage impairing its normal operation		
	Equipment with locking mean, no locking in the open position while test force is applied		
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY		
8.3.4.1	Operational performance test at ambient temperature: 70 °C		
	- utilization category	DC-21B	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- rated operational voltage (V)	1000 V	—
	- rated operational current (A)	16 A	—
	Test conditions for electrical operation cycles:		
	- test voltage (V)	L1: 1002 V dc L2: L3:	—
	- test current (A)	L1: 16,21 A L2: L3:	—
	- power factor/time constant	L1: 1,004 ms L2: L3:	—
	Number of cycles with current	300	P
	Number of cycles without current	1700	P
	First test sequence (with/without current)	Without current	—
	Second test sequence (with/without current)	With current	—
	- time interval between first and second test sequence	30 s	—
8.3.4.1.5	Behaviour of the equipment during the operational performance test		
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after making and breaking capacity tests		
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test	63 N	P

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Clause	Requirement + Test	Result - Remark	Verdict
	force of 8.2.5.2 and table 8		
	- equipment is able to carry its rated current after normal closing operation		P
8.3.4.2	Dielectric verification		
	test voltage: 2*Ue with a minimum of 1000V~	1700 Vac	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		
	test voltage (1,1 Ue) (V)	935 Vdc	—
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA/pole ...		N/A
	Leakage current (other utilization categories) ≤ 2 mA/pole	< 0,03µA	P
8.3.4.4	Temperature-rise verification		
	- conductor cross-section (mm ²)	2,5 mm ²	—
	- test current Ie (A)	16 A	—
	Measured temperature-rise	13 K to 16 K see appended table 8.3.4.4 on page 28	P
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) (>12.I _e max)	500 A	
	test voltage (V)	L1: 1000 V L2: L3:	—
	r.m.s. test current (A)	L1: 503,5 A L2: L3:	—
	peak test current (A)	L1: 503,5 A L2: L3:	—
	power factor/time constant	L1: 5,009 ms L2: L3:	—

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Clause	Requirement + Test	Result - Remark	Verdict
	test duration (s)	1,006 s	—
8.3.5.1.5	Behaviour of the equipment during the test		
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.5.1.6	Condition of the equipment after making and breaking capacity tests		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8	62 N	P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5.2	Short-circuit making capacity		
	Rated short-circuit making capacity I _{cm} (A) :	500 A	
	test voltage (1.05xU _e)(V):	L1: : 1000 V L2: L3:	—
	r.m.s. test current (A)	L1: 503,5 A L2: L3:	—
	maximum peak test current (factor n)		
	power factor/time constant	L1: 5,009 ms L2: L3:	
	current duration (s)	60 ms	—
	Time interval between the cycles	30	—
8.3.5.2.5	Behaviour of the equipment during the test		
	Test performed without:		—
	- endanger to the operator		P
	-cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.5.2.6	Condition of the equipment after making and breaking capacity tests		
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8	63 N	P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.5.3	Dielectric verification		
	test voltage: 2*U _e with a minimum of 1000V~	2000 Vac	—
	No flashover or breakdown		P
8.3.5.4	Leakage current		
	test voltage (1,1 U _e) (V)	1100 V	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA/pole ... :		N/A
	Leakage current (other utilization categories) $\leq 2,0$ mA/pole	< 0,02 μ A	P
8.3.5.5	Temperature-rise verification		
	- conductor cross-section (mm ²)	4 mm ²	—
	- test current I _e (A)	25 A, at request of the manufacturer	—
	Measured temperature-rise	25-28 K see appended table 8.3.5.5 on page 28	
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		N/A
8.4	ELECTROMAGNETIC COMPATIBILITY TESTS		N/A
	Annex A (normative)		N/A
	Annex C (normative)		N/A
	Annex Q		N/A

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Clause	Requirement + Test	Result - Remark				Verdict
7.1.3	TABLE: Clearance and creepage distance measurements					
clearance cl and creepage distance crd at/of:	Up (V)	Ui (V)	required cl (mm)	cl (mm)	required crd (mm)	crd (mm)
P-P	/	1000	8,0	≥ 9,50	12,5	≥ 14
Open contact	/	1000	8,0	≥ 11,2	12,5	≥ 14
PP-mounting plate	/	1000	8,0	11,1	12,5	*)
supplementary information: *) with additional empty contact holder distance ≥ 14 mm						

8.3.3.1	TABLE: Temperature-rise (measurements)		
Temperature rise dT of part: seq I Ambient 21°C, new		dT (K) measured	dT (K) required
Terminals (main)		15 - 17	70
Manual operating means: metallic / non-metallic		2	25
Parts intended to be touched but not hand-held: metallic / non-metallic		1	40
Parts which need not be touched during normal operation		13	50
supplementary information: main contacts loaded with 16 A			

8.3.3.1	TABLE: Temperature-rise (measurements)		
Temperature rise dT of part: seq I Ambient 71°C, new		dT (K) measured	dT (K) required
Terminals (main)		15 - 16	35
Manual operating means: metallic / non-metallic		1	25
Parts intended to be touched but not hand-held: metallic / non-metallic		1	15
Parts which need not be touched during normal operation		12	75
supplementary information: main contacts loaded with 16 A			

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8.3.3.6	TABLE: Temperature-rise (measurements)	
Temperature rise dT of part: Seq I after Make/Break tests, ambient 25°C		dT (K) measured
		dT (K) required
Terminals		15-17
Manual operating means: metallic / non-metallic		2
Parts intended to be touched but not hand-held: metallic / non-metallic		2
Parts which need not be touched during normal operation		10
supplementary information: main contacts loaded with 16 A		

8.3.4.4	TABLE: Temperature-rise (measurements)	
Temperature rise dT of part: Seq II after operational performance, ambient 70°C		dT (K) measured
		dT (K) required
Terminals		13 - 16
Manual operating means: metallic / non-metallic		2
Parts intended to be touched but not hand-held: metallic / non-metallic		2
Parts which need not be touched during normal operation		16
supplementary information: main contacts loaded with 16 A		

8.3.5.5	TABLE: Temperature-rise (measurements)	
Temperature rise dT of part: Seq III after short-circuit performance,		dT (K) measured
		dT (K) required
Terminals		25 - 28
Manual operating means: metallic / non-metallic		3
Parts intended to be touched but not hand-held: metallic / non-metallic		5
Parts which need not be touched during normal operation		19
supplementary information: main contacts loaded with 25 A, on request of manufacturer		

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Type designation:

For example: XA100.16.R10-A

		description	Options
	XA	X-type	
	100	DC nominal Voltage divided by ten	
	.	Separator	
	16	Nominal Current	
	R	Mounting type, Panel mounting	B, D, P, R
	10	DC poles	1, 2, 3, 4, 5, 6, 7, 8,
	A	Actuator	A, B, C, D, O, P, Q

Knob types

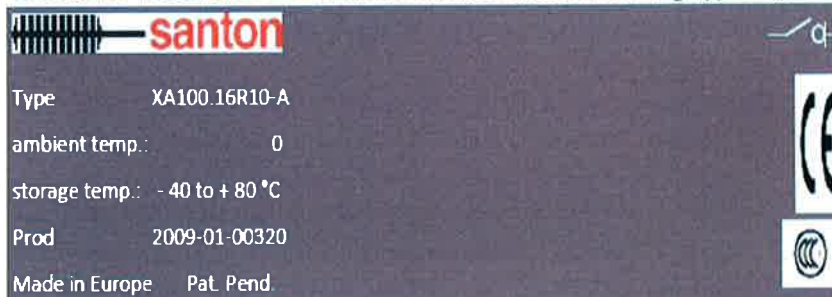
A = standard black knob

Marking of the switch-disconnector

The labels for a switch-disconnector with the specifications are shown in the production order. For the Reversed switches the labels are a little different from the rest because of the space available.

For example:



Labels for IEC and CCC certified switches with mounting types B, P and D





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EN-IEC60947-3			Ith 16A	PLDGR 2
poles:	Ie	Ue	Ui	
1-10	16A	1000V	DC-21B	1000 1000

Labels for IEC and CCC certified switches with Reverse contacts, mounting type R (printed

type: XA100.16R10-A
 Prod: 2009-01-00320
 Made in Europe Pat. Pend.

EN-IEC60947-3			Ith: 16A	Ui
poles:	Ie	Ue	Ui	
1-10	16A	1000V	DC-21B	1000 16

The terminal marking will be:

DC contacts	+1 / +1 -1 / -1 +2 / +2 -2 / -2 +3 / +3 -3 / -3 +4 / +4 -4 / -4
-------------	--

The terminals for each string the plus and the minus are numeric character indicated, AC contacts are indicated with alphabetic character indicated,

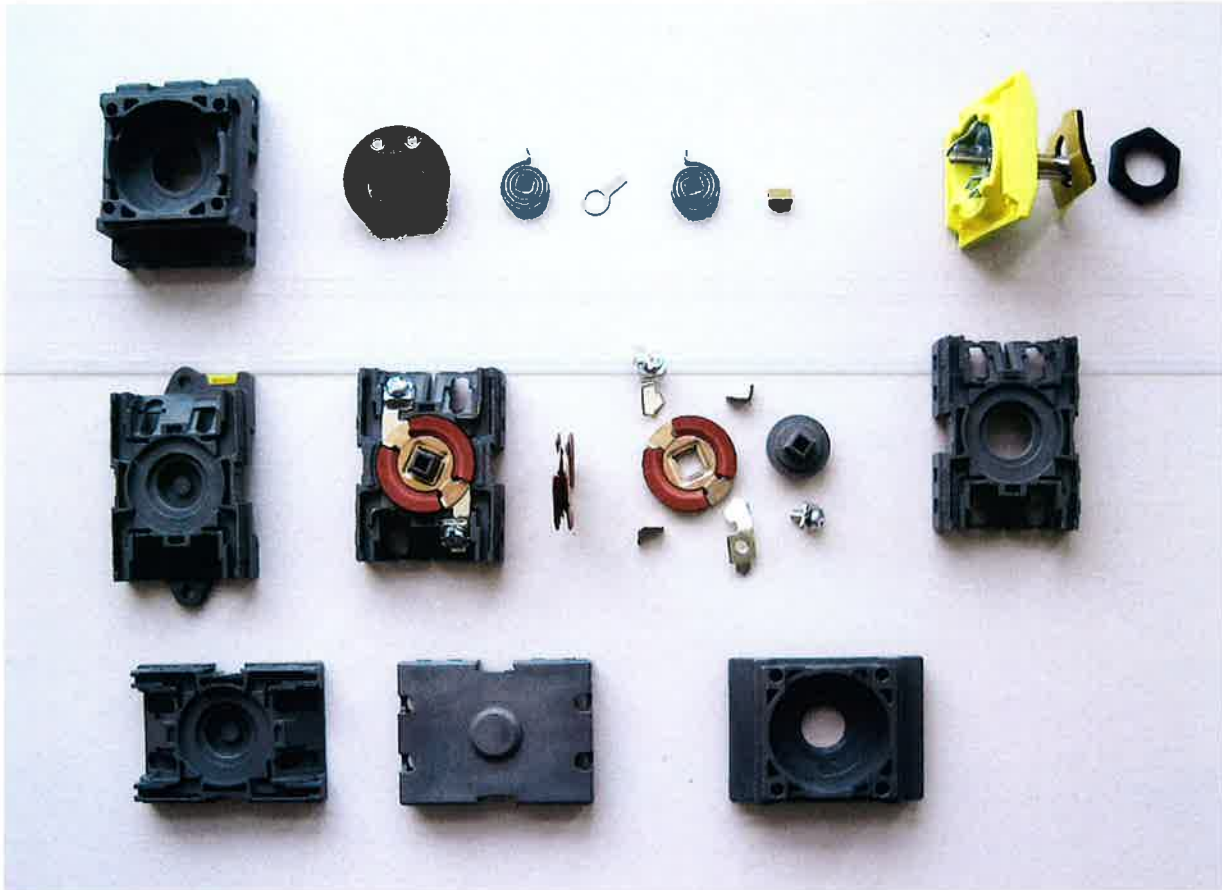
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Photo :
for example



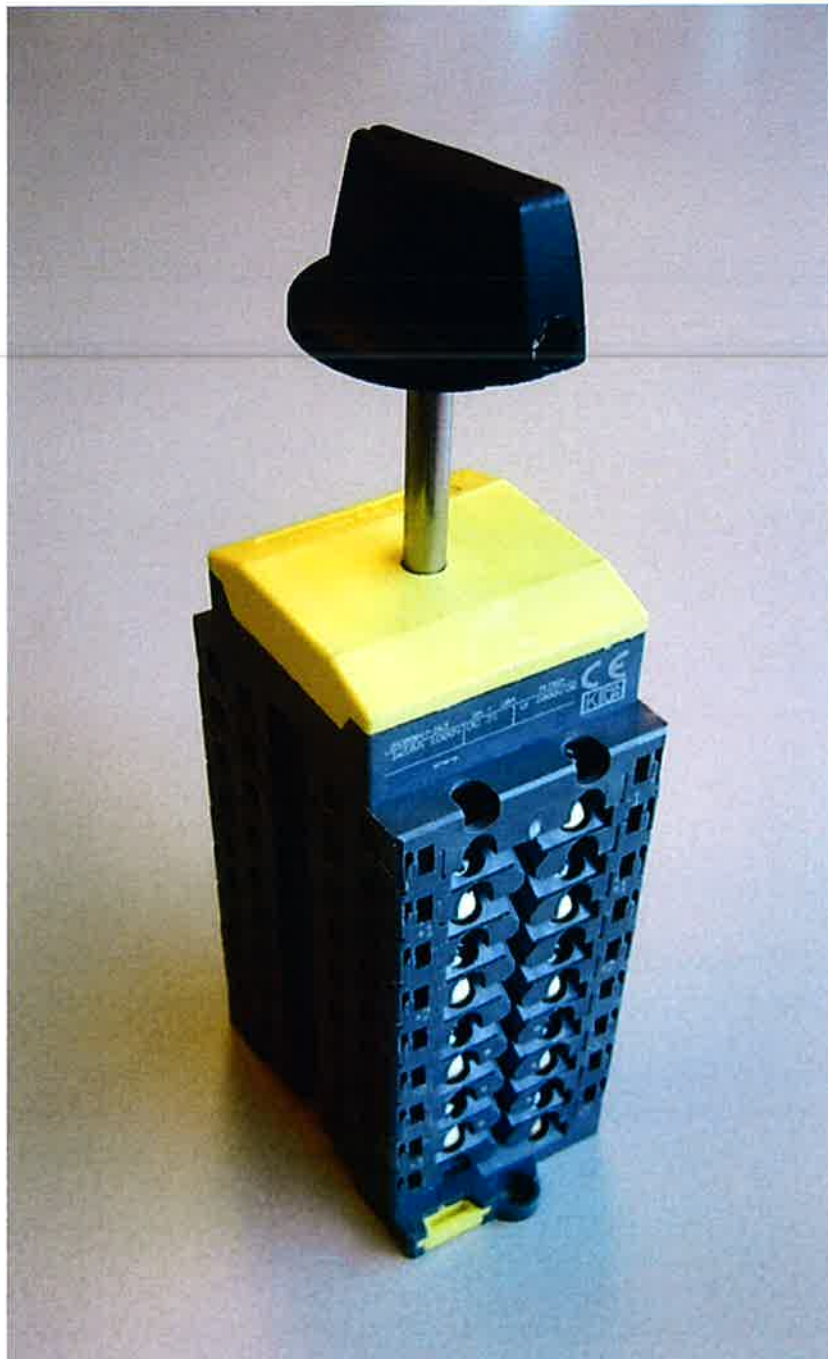
IEC 60947-3

Photo :



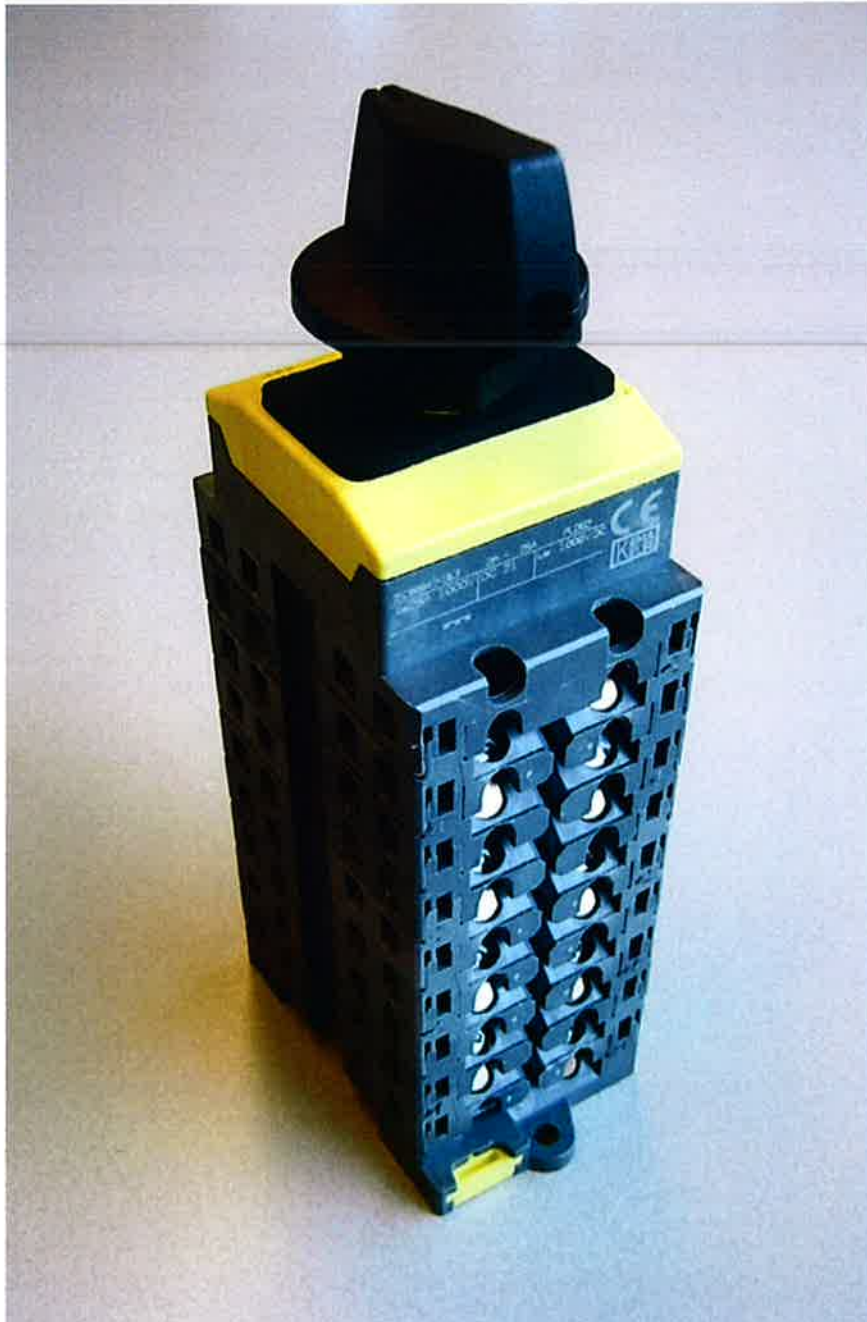
IEC 60947-3

Photo : B Bottom mounting
for example



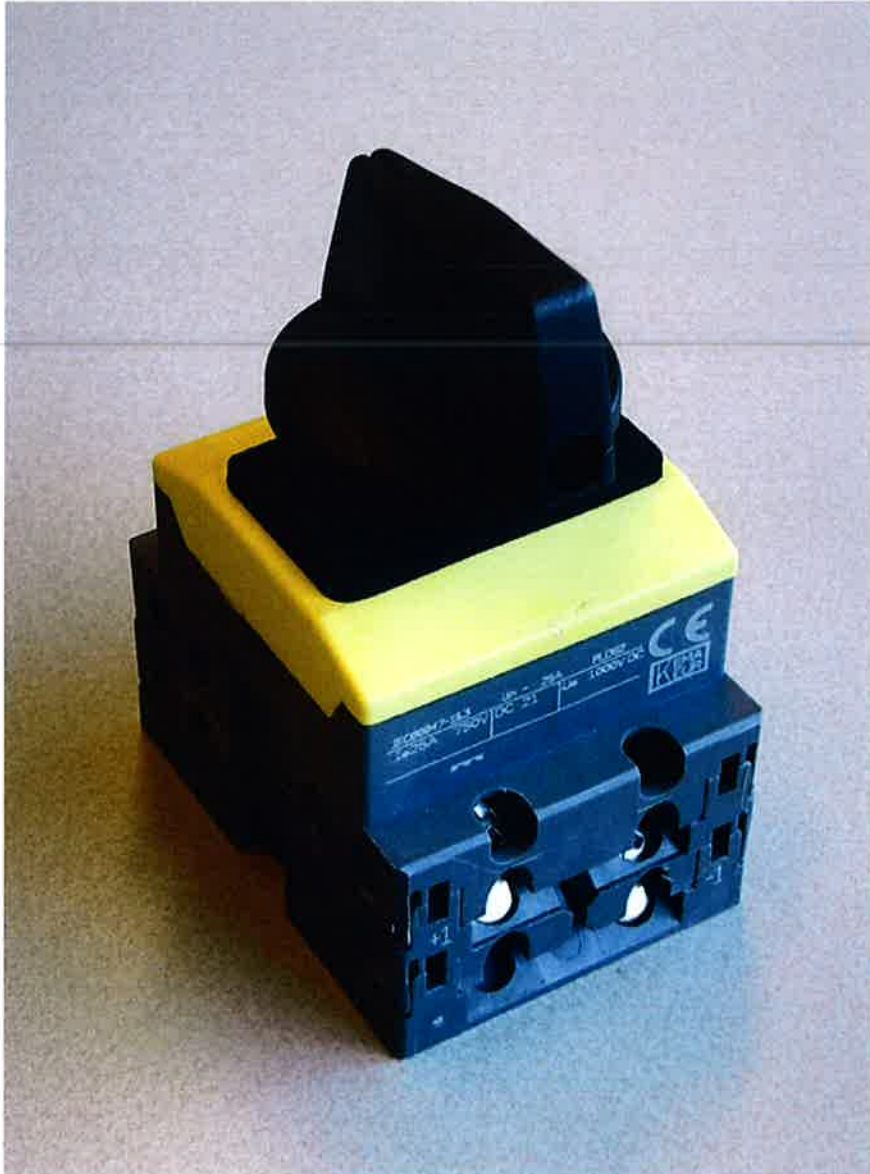
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Photo : D Bottom and panel mounting
for example



IEC 60947-3

Photo : P panel mounting
for example



IEC 60947-3

Photo : R reverse panel mounting
for example

