

TECHNICAL CONSTRUCTION FILE

EN 60947-6-1:2005+A1:2014

Low-voltage switchgear and controlgear —Part 6-1: Multiple function equipment —
Transfer switching equipment

Report

Report reference No.....: TLGW22062339402
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Testing laboratory

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Client

Name: CANTEZ ELEKTRİK MÜHENDİSLİK SAN. VE TİC. LTD. ŞTİ.
 Address.....: MECIDIYE NEIGHBORHOOD, FATİH AVENUE, BEY STREET NO:15
 SULTANBEYLI / ISTANBUL

Test specification

Standard.....: EN 60947-6-1:2005+A1:2014
 Test procedure: CE-LVD
 Procedure deviation.....: N.A.
 Non-standard test method.....: N.A.

Test report form/blank test report

Test report form No..... EN 60947-6-1
 TRF modified by..... Shanghai Global Testing Services Co., Ltd
 Master TRF..... PS_INFO\2-ELS.MES\REPORTS\CCA
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Test item	
Type of test object	Automatic Transfer Switch
Trademark	ALCOR
Test model and/or type reference.....	ALCQ1-63, ALCQ1-100, ALCQ1-125, ALCQ1-160, ALCQ1-200, ALCQ1-250, ALCQ1-400, ALCQ1-630, ALCQ1-800, ALCQ1-1000, ALCQ1-1250, ALCQ1-1600, ALCQ1-2000, ALCQ1-2500, ALCQ1-3200
Manufacturer.....	CANTEZ ELEKTRİK MÜHENDİSLİK SAN. VE TİC. LTD. ŞTİ.
Address.....	MECIDIYE NEIGHBORHOOD, FATİH AVENUE, BEY STREET NO:15 SULTANBEYLI / ISTANBUL
Rated	Ue:380VAC, 50/60Hz; Ui:690V, Uimp:8kV, Ie:63A
Equipment mobility.....	/
Duty Class.....	Uninterrupted duty
Rated Speed.....	/
Thermal class.....	/
Type cooling.....	/
Primary coolant.....	No
Maximum ambient air temperature(°C)	-5°C to +40°C
Altitude above seal level(m)	<2000
IP degree of machine.....	
Mass of equipment(Kg).....	/
Secondary coolant.....	/
Operating condition	Continuous
Tested for IT power systems :	No
IT testing, phase-phase voltage (V) :	N.A.
Class of equipment :	
Testing	
Date of receipt of test item.....	June 16,2022
Date(s) of performance of test.....	June 16,2022 to June 23,2022
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	
<p>“(see remark #)” refers to a remark appended to the report.</p> <p>“(see appended table)” refers to a table appended to the report.</p> <p>Throughout this report a comma is used as the decimal separator.</p> <p>The test results presented in this report relate only to the object tested.</p> <p>This report shall not be reproduced except in full without the written approval of the testing laboratory.</p>	

Brief description of the tested sample(s):

Ambient temperature :20°C~25°C, humidity:50%~55%RH

Complete test was conducted on ALCQ1-63.

A representative sample of the product covered by this report has been tested and complies with the applicable requirements of this standard.

Copy Of Marking Plate:

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EN 60947-6-1			
4	Classification		P
	Data which may be used as criteria for classification are given in 5.2.	Pass muster	P
	a) their short-circuit capability(EN 60947-6-1)		P
	class PC: TSE that is capable of making and withstanding, but is not intended for breaking short-circuit currents(EN 60947-6-1)		P
	class CB: TSE that is capable of making, withstanding and is intended for breaking short-circuit currents and is provided with over-current releases(EN 60947-6-1)		N
	class CC: TSE that is capable of making and withstanding, but is not intended for breaking(EN 60947-6-1)		N
	b) the method of controlling the transfer:		P
	manually operated switching equipment(EN 60947-6-1)		N
	"remotely" operated switching equipment(EN 60947-6-1)		N
	Automatic Transfer Switching equipment(EN 60947-6-1)		P
5	Characteristics		P
5.1	Summary of characteristics		
	–Type of equipment (5.2); (EN 60947-6-1)		P
	–Rated and limiting values for the main circuit (5.3); (EN 60947-6-1)		P
	– utilization categories (5.4); (EN 60947-6-1)		P
	– control circuits (5.5); (EN 60947-6-1)		P
	– auxiliary circuits (5.6); (EN 60947-6-1)		P
	Where the TSE uses IEC 60947 products, the relevant characteristics from those standards may also be additionally used		P
5.2	Type of equipment		P
5.2.1	Class and transfer control method of the equipment(EN 60947-6-1)		P
5.2.2	Number of poles(EN 60947-6-1)		P
5.2.3	Kind of current (a.c. or d.c.) (EN 60947-6-1)	A.C	P

5.2.4	operating sequence(EN 60947-6-1)	Automatic transfer, Automatic return	P
5.2.5	Method of control	automatic	P
5.3	Rated and limiting values of the main circuit		P
	These values shall be stated in accordance with 5.3.1 to 5.3.6 but it may not be necessary to establish all the values listed.		P
5.3.1	Rated voltages		P
5.3.1.1	Rated operational voltage (U_e)	Ue: 380VAC	P
	Subclause 4.3.1.1 of IEC 60947-1 applies		P
5.3.1.2	Rated insulation voltage (U_i)	Ui: 690V	P
	Subclause 4.3.1.2 of IEC 60947-1 applies.		P
5.3.1.3	Rated impulse withstand voltage (U_{imp})	Uimp: 8kV	P
	Subclause 4.3.1.3 of IEC 60947-1 applies.		P
5.3.2	Rated operational current (I_e)	Ie:63A	P
	The rated operational current of TSE is the rated uninterrupted current (I_u). See 4.3.2.4 of IEC 60947-1.		P
5.3.3	Rated frequency	50/60Hz	P
	Subclause 4.3.3 of IEC 60947-1 applies.		
5.3.4	Uninterrupted duty		P
	Subclause 4.3.4.2 of IEC 60947-1 applies.		
5.3.5	Rated making and breaking capacities		P
5.3.5.1	The rated making and breaking capacities are the values of current, stated by the manufacturer, which the transfer equipment can satisfactorily make and break under specified conditions. Unless stated otherwise, they are given in terms of a steady state current value. During the making operation, the peak value of the current on contact closing may be higher than the peak value of the steady state current depending on the characteristics of the test circuit (load) and the instant of closing on the voltage wave.		P
5.3.6	Short-circuit characteristics		P
5.3.6.1	Rated short-time withstand current (I_{cw})		P
5.3.6.2	Rated short-circuit making capacity (I_{cm})		P

5.3.6.3	Rated short-circuit breaking capacity (I_{cn})		P
5.3.6.4	Rated conditional short-circuit current		P
5.4	Utilization category		P
	The utilization category of an equipment defines the intended application and shall be specified in the relevant product standard; it is characterized by one or more of the following service conditions: Examples of utilization categories for low-voltage switchgear and controlgear are given in Annex A.		P
5.5	Control circuits		P
5.5.1	Electro-mechanical devices controlling the main circuit		P
	– kind of current;	AC	P
	– rated frequency if a.c.;	50/60Hz	P
	– rated control circuit voltage U_c (nature, and frequency if a.c.);		P
	– rated control supply voltage U_s (nature, and frequency if a.c.), where applicable.		P
	The minimum and maximum values of voltage or voltage and frequency operating limits shall be stated by the manufacturer. These limits shall correspond to the limits for the transfer control devices(EN 60947-6-1)		
5.5.2	Transfer control devices(EN 60947-6-1)		P
	The manufacturer shall state the following:		---
	a) the voltage and frequency deviations at which transfer should occur(EN 60947-6-1)		P
	b) the contact transfer time and the off time range for all TSE(EN 60947-6-1)		P
	c) the operating transfer time and the return transfer time range for ATSE(EN 60947-6-1)		P
	The tolerance of the voltage frequency deviations and of the times shall be specified by the manufacturer but no more than $\pm 10\%$. If the time value is lower than 1 s, the manufacturer shall state the tolerances(EN 60947-6-1)		P
5.6	Auxiliary circuits		P

	The characteristics of auxiliary contacts and switches shall comply with the requirements of the above standard.	Pass muster	P
6	Product information		
6.1	Nature of the information	Pass muster	P
	The following information shall be given by the manufacturer concerning:		P
	Identification		P
	a) The manufacturer's name or trademark		P
	b) Type designation or serial number		P
	c) Number of this part , if the manufacturer claims compliance		P
	d) class of equipment: PC, CB or CC; (EN 60947-6-1)		P
	e) rated operational voltage(s); (EN 60947-6-1)		P
	f) utilization category and rated operational current at the rated operational voltage(EN 60947-6-1)		P
	g) either value of the rated frequency, for example: 50 Hz or the indication "d.c." (or the symbol <u> </u> - - -)		P
	h) rated short-circuit making capacity for class PC		P
	i) rated short-time withstand current, where applicable;		P
	j) rated conditional short-circuit current and associated SCPD		P
	k) rated short-circuit making and breaking capacities for Class CB		N
	l) number of main contact positions		P
	m) monitored supply deviation and operating limits		P
	n) operating sequence time data according to 5.5.2 b), time delays and their position in the operating sequence if any		P
	o) rated impulse withstand voltage		P
	p) environment A or B.		P
	q) special requirements, if applicable, for example shielded or twisted conductors;		P

	r) length of insulation to be removed before insertion of the conductor into the terminal		P
	s) maximum number of conductors which may be clamped		P
	t) for non-universal screwless terminals:		P
	"s" or "sol" for terminals declared for rigid-solid conductors		P
	"r" for terminals declared for rigid (solid and stranded) conductors		P
	"f" for terminals declared for flexible conductors		P
	u) switching position of the TSE		P
6.2	Marking		P
6.3	Instructions for installation, operation and maintenance		P
	Subclause 5.3 of IEC 60947-1 applies.	Pass muster	P
7	Normal service, mounting and transport conditions		P
7.1	Normal service conditions		P
	Equipment complying with this standard shall be capable of operating under the following standard conditions:	May operate	P
7.1.1	Ambient air temperature		P
	The ambient air temperature does not exceed +40 °C and its average over a period of 24 h does not exceed +35 °C.	Pass muster	P
	The lower limit of the ambient air temperature is -5 °C.	Pass muster	P
	Ambient air temperature is that existing in the vicinity of the equipment if supplied without enclosure, or in the vicinity of the enclosure if supplied with an enclosure.	Pass muster	P
7.1.2	Altitude		P
	The altitude of the site of installation does not exceed 2 000 m.		P
7.1.3	Atmospheric conditions		P
7.1.3.1	Humidity		

	The relative humidity of the air does not exceed 50 % at a maximum temperature of +40 °C. Higher relative humidities may be permitted at lower temperatures, e.g. 90 % at +20 °C. Special measures may be necessary in cases of occasional condensation due to variations in temperature.		P
7.1.3.2	Degrees of pollution		P
	Unless otherwise stated by the manufacturer's, a CPS is for use in pollution degree 3 environmental conditions, as defined in 6.1.3.2 of Part 1. However, other pollution degrees may be considered to apply depending upon the micro-environment		P
7.1.4	Shock and vibration		P
	Standard conditions of shock and vibration to which the equipment can be submitted are under consideration.	No damage	P
7.2	Conditions during transport and storage		P
	A special agreement shall be made between user and manufacturer if the conditions during transport and storage, e.g. temperature and humidity, differ from those defined in 6.1, except that, unless otherwise specified, the following temperature range applies during transport and storage: between -25 °C and +55 °C and, for short periods not exceeding 24 h, up to +70 °C.	Pass muster	P
	Equipment subjected to these extreme temperatures without being operated shall not undergo any irreversible damage and shall then operate normally under the specified conditions.	No damage	P
7.3	Mounting		P
	The equipment shall be mounted in accordance with the manufacturer's instructions.	See the manufacturer's instructions	P
8	Constructional and performance requirements		P
8.1	Constructional requirements		P
	Subclause 7.1 of IEC 60947-1 applies with the following additions.	Pass muster	P
8.1.1	Resistance to abnormal heat and fire		P
	Subclause 7.1.2 of IEC 60947-1:2007, Amendment 1 (2010) applies.		

8.1.2	Indication of the switching position		--
	The indicating means of TSE shall indicate the normal, alternative and if any, the Off position. The marking shall be preferably in accordance with IEC 60417:		P
	– I Normal (60417-IEC-5007:2002) – O Off (60417-IEC-5008:2002) – II Alternative (60417-IEC-6176:2012)		P
8.1.3	Equipment suitable for isolation		--
	Subclause 7.1.7 of IEC 60947-1:2007, Amendment 1 (2010) applies with the following addition:		P
8.2	Performance requirements		P
	The following requirements apply to clean new equipment unless otherwise stated in the relevant product standard.	Pass muster	P
8.2.1	Operating conditions		P
	Subclause 7.2.1 of IEC 60947-1 applies with the following additions:		
8.2.2	Temperature-rise		P
8.2.2.1	Terminals		P
8.2.2.2	Accessible parts		P
8.2.2.3	Ambient air temperature		P
8.2.2.4	Main circuit	Pass muster	P
8.2.2.5	Control circuits	Pass muster	P
8.2.2.6	Windings of coils and electromagnets		N
8.2.2.7	Auxiliary circuits	Pass muster	P
8.2.2.8	Other parts		P
8.2.3	Dielectric properties	No breakdown or flashover	P
8.2.3.1	Impulse withstand voltage		P
8.2.3.2	Power-frequency withstand voltage of the main, auxiliary and control circuits		P
8.2.3.3	Clearances	Pass muster	P
8.2.3.4	Creepage distances	Pass muster	P
8.2.3.5	Solid insulation	Pass muster	P

8.2.3.6	Spacing between separate circuits		P
8.2.4	Ability to make, carry and break currents under no-load,	Pass muster	P
8.2.4.1	Making and breaking capacities	Pass muster	P
8.2.4.2	Operational performance	Pass muster	P
8.2.4.3	Durability		P
8.2.4.3.1	Mechanical durability		P
8.2.4.3.2	Electrical durability		P
8.2.5	Ability to make, carry and break short-circuit currents	According with the requirement of standard	P
8.3	Electromagnetic compatibility (EMC)	Not applicable	N
8.3.1	For products falling within the scope of this standard, two sets of environmental conditions are considered and are referred to as a) environment A; b) environment B.	environment B	--
8.3.2	Immunity		N
8.3.2.1	Equipment not incorporating electronic circuits		N
	Equipment not incorporating electronic circuits is not sensitive to electromagnetic disturbances in normal service conditions, and therefore no immunity tests are required.		N
8.3.2.2	Equipment incorporating electronic circuits		P
8.3.3	Emission		P
8.3.3.1	Equipment not incorporating electronic circuits		N
8.3.3.2	Equipment incorporating electronic circuits		P
8.3.3.2.1	Limits for high-frequency emissions		P
8.3.3.2.2	Limits for low-frequency emissions		P
9	tests		P
9.1.2	Type test		
	Type tests are intended to verify compliance of the design of a given equipment with this standard, where applicable, and the relevant product standard.	According with requirement of standard	P
9.1.3	Routine tests		N
9.1.4	Sampling tests		N

	If engineering and statistical analysis show that routine tests (on each product) are not required, sampling tests may be made instead, if so stated in the relevant product standard.		N
	The tests may comprise a) functional tests; b) dielectric tests.		N
9.2	Compliance with constructional requirements		P
	The verification of compliance with the constructional requirements stated in 7.1 concerns, for example	Pass muster	P
	– the materials;	Pass muster	P
	– the equipment;	Pass muster	P
	– the degrees of protection of enclosed equipment;	See nameplate	P
	– the mechanical properties of terminals;	Pass muster	P
	– the actuator;		P
	– the position indicating device (see 2.3.18).	Pass muster	P
9.2.1	Materials		P
9.2.1.1	Test of resistance to abnormal heat and fire	May resist to abnormal heat and fire	P
9.2.1.1.1	Glow-wire test (on equipment)		P
	The glow-wire test shall be made according to clauses 4 to 10 of IEC 60695-2-10 and IEC 60695-2-11 under the conditions specified in 7.1.1.1.	No danger	P
9.2.1.1.2	Flammability, hot wire ignition and arc ignition tests (on materials)	Not applicable	N
9.2.2	Equipment		P
9.2.3	Enclosures for equipment		P
9.2.3	Enclosures for equipment see Annex C.	Pass muster	P
9.2.4	Mechanical properties of terminals		P
	This subclause does not apply to aluminium terminals nor to terminals for connection of aluminium conductors.	No aluminium conductors nor aluminium terminals	P
9.2.4.1	General conditions for tests		P

	Unless otherwise stated by the manufacturer, each test shall be made on terminals in a clean and new condition.	Pass muster	P
9.2.4.2	Tests of mechanical strength of terminals		P
	Tests shall be made with the appropriate type of conductor having the maximum cross-sectional area.		P
	The conductor shall be connected and disconnected five times.	No damage	P
	For screw-type terminals, the tightening torque shall be in accordance with Table 4 or 110 % of the torque specified by the manufacturer, whichever is the greater.	No damage	P
9.2.4.3	Testing for damage to and accidental loosening of conductors (flexion test)	No damage	P
	The test applies to terminals for the connection of unprepared round copper conductors, of number, cross-section and type (flexible and/or rigid (stranded and/or solid)), specified by the manufacturer.		P
	Terminals intended for connection of both flexible or rigid (solid and/or stranded) conductors simultaneously shall be tested as stated in c) above		P
	During the test, the conductor shall neither slip out of the terminal nor break near the clamping unit.	Don't slip out nor r break	P
	Immediately after the flexion test, each conductor under test shall be submitted in the test equipment to the test of 8.2.4.4 (pull-out test).		N
9.2.4.4	Pull-out test		N
9.2.4.4.1	Round copper conductors		N
	The force shall be applied without jerks for 1 min.		N
	During the test, the conductor shall neither slip out of the terminal nor break near the clamping unit.		N
9.2.4.4.2	Flat copper conductors		N
	A suitable length of conductor shall be secured in the terminal and the pulling force given in Table 6 applied without jerks for 1 min in a direction opposite to that of the insertion of the conductor.		N

	During the test, the conductor shall neither slip out of the terminal nor break near the clamping unit.		N
9.2.4.5	Test for insertability of unprepared round copper conductors having the maximum specified cross-section	Pass muster	P
9.2.4.5.1	Test procedure		P
	The measuring section of the gauge shall be able to penetrate freely into the terminal aperture to the full depth of the terminal (see also note to Table 7).	According with requirement of standard	P
9.2.4.5.2	Construction of gauges		P
	Details of dimensions a and b and their permissible deviations are shown in Table 7. The measuring section of the gauge shall be made from gauge steel.	See instruction	P
9.2.4.6	Tests for insertability of flat conductors with rectangular cross-section		N
	Under consideration.		N
9.2.5	Verification of the effectiveness of indication of the main contact position of equipment suitable for isolation	Pass muster	P
	To verify the effectiveness of the indication of the main contact position as required by 7.1.6, all means of indication of contact position shall continue to function correctly after the operational performance type tests, and special durability tests if performed.		P
9.2.5.1	Condition of equipment for the tests		P
	The condition of the equipment for the tests shall be stated in the relevant product standard.	According with requirement of standard	P
9.2.5.2	Method of test		P
9.2.5.3	Condition of equipment during and after test		P
9.2.5.3.1	Dependent and independent manual operation		P
	After the test, when the test force is no longer applied, the actuator being left free, the open position shall not be indicated by any of the means provided and the equipment shall not show any damage such as to impair its normal operation.	No damage	P
9.2.5.3.2	Dependent and independent power operation		N

	During and after the test, the open position shall not be indicated by any of the means provided and the equipment shall not show any damage such as to impair its normal operation.		N
	When the equipment is provided with means for locking in the open position, it shall not be possible to lock the equipment during the test.		N
9.2.6	Vacant	Not applicable	N
9.2.7	Conduit pull-out test, torque test and bending test with metallic conduits	No this metallic conduits	N
	The tests shall be made in the sequence 8.2.7.1, 8.2.7.2 and 8.2.7.3.		N
9.2.7.1	Pull-out test	Not applicable	N
	After the test, the displacement of the conduit in relation with the entry shall be less than one thread depth and there shall be no evidence of damage impairing further use of the enclosure.		N
9.2.7.2	Bending test	Not applicable	N
	When the bending moment results in a deflection of the conduit of 25 mm per 300 mm length, or the bending moment has reached the value given in Table 21, the moment is maintained for 1 min. The test is then repeated in a perpendicular direction.		N
	After the test there shall be no evidence of damage impairing further use of the enclosure.		N
9.2.7.3	Torque test	Not applicable	N
	For enclosures provided with a single conduit connection up to and including 16 H, the tightening torque is reduced to 25 N·m.		N
	After the test, it shall be possible to unscrew the conduit and there shall be no evidence of damage impairing further use of the enclosure.		N
9.3	Performance	Pass muster	P
9.3.1	Test sequences		P
	Where applicable, the relevant product standard shall specify the test sequences to which the equipment is to be submitted.	According with requirement of standard	P
9.3.2	General test conditions		P

9.3.2.1	General requirements		P
9.3.2.2	Test quantities	According with requirement of standard	P
9.3.2.2.1	Values of test quantities		P
	All the tests shall be made with the values of test quantities corresponding to the ratings assigned by the manufacturer, in accordance with the relevant tables and data of the relevant product standard.	Pass muster	P
9.3.2.2.2	Tolerances on test quantities		P
	The test recorded in the test report shall be within the tolerances given in Table 8, unless otherwise specified in the relevant subclauses. However, with the agreement of the manufacturer, the tests may be made under more severe conditions than those specified.	According with requirement of standard	P
9.3.2.2.3	Recovery voltage		P
	a) Power-frequency recovery voltage		P
	b) Transient recovery voltage		P
9.3.2.3	Evaluation of test results		P
	Behaviour of the equipment during the tests and its condition after the tests shall be specified in the relevant product standard. For short-circuit tests, see also 8.3.4.1.7 and 8.3.4.1.9.		P
9.3.2.4	Test reports		P
9.3.3	Performance under no-load, normal load and overload conditions		P
9.3.3.1	Operation		P
	Tests shall be made to verify that the equipment operates correctly according to the requirements of 7.2.1.1.	Pass muster	P
9.3.3.2	Operating limits		P
9.3.3.2.1	Power operated equipment		P

	It shall be verified that the equipment opens and closes correctly within the limiting values of the control quantities, such as voltage, current, air pressure and temperatures, specified in the relevant product standard. Tests are made with no current flowing through the main circuit, unless otherwise specified.	Pass muster	P
9.3.3.2.2	Relays and releases	Not this appliance	N
9.3.3.3	Temperature-rise	Pass muster	P
9.3.3.3.1	Ambient air temperature		P
	During the tests, the ambient air temperature shall be between +10 °C and +40 °C and shall not vary by more than 10 K		P
9.3.3.3.2	Measurement of the temperature of parts	Pass muster	P
9.3.3.3.3	Temperature-rise of a part	Pass muster	P
9.3.3.3.4	Temperature-rise of the main circuit		P
9.3.3.3.5	Temperature-rise of control circuits		P
9.3.3.3.6	Temperature-rise of coils of electromagnets		N
9.3.3.3.7	Temperature-rise of auxiliary circuits		P
9.3.3.4	Dielectric properties		P
9.3.3.4.1	Type tests		P
	1) General conditions for withstand voltage tests		P
	The equipment to be tested shall comply with the general requirements of 8.3.2.1.		P
	2) Verification of impulse withstand voltage		P
	3) Power-frequency withstand verification of solid insulation		P
	4) Power-frequency withstand verification after switching and short-circuit tests		P
	5) Vacant		N
	6) Verification of d.c. withstand voltage Under consideration.		N
	7) Verification of creepage distances		P
	8) Verification of leakage current of equipment suitable for isolation		P
9.3.3.4.2	Routine tests		N
9.3.3.4.3	Sampling tests for verification of clearances		N

9.3.3.4.4	Tests for equipment with protective separation		P
	Tests for equipment with protective separation are given in Annex N.	Pass muster	P
9.3.3.5	Making and breaking capacities	Pass muster	P
8.3.3.5.1	General test conditions		P
	Tests for verification of making and breaking capacities shall be made according to the general test requirements stated in 8.3.2.	Pass muster	P
9.3.3.5.2	Test circuit		P
9.3.3.5.3	Characteristics of transient recovery voltage		P
9.3.3.5.4	Vacant	Not applicable	N
9.3.3.5.5	Test procedure for making and breaking capacities		P
	The number of operations, the "on" and "off" times and the ambient conditions shall be stated in the relevant product standard.	According with requirement of relevant standard	P
9.3.3.5.6	Behaviour of the equipment during and after making and breaking capacity tests		P
	The criteria for acceptance during and after the tests shall be stated in the relevant product standard.	Pass muster	P
9.3.3.6	Operational performance capability		P
	Detailed test conditions shall be stated in the relevant product standard.	Pass muster	P
9.3.3.7	Durability		P
	Durability tests are intended to verify the number of operating cycles that an equipment is likely to be capable of performing without repair or replacement of parts.		P
9.3.3.7.1	Mechanical durability	4500 times	P
9.3.3.7.2	Electrical durability	1500 times	P
	Evaluation of test results shall be defined in the relevant product standard.		P
9.3.4	Performance under short-circuit conditions	No damage	P
9.3.4.1	General conditions for short-circuit tests	No damage	P
9.3.4.1.1	General requirements		P
	Additional test conditions may be specified in the relevant product standard.	Pass muster	P
9.3.4.1.2	Test circuit		P

9.3.4.1.3	Power-factor of the test circuit		P
	For a.c., the power-factor of each phase of the test circuit should be determined according to an established method which shall be stated in the test report.		P
9.3.4.1.4	Time-constant of the test circuit		N
	For d.c., the time-constant of the test circuit may be determined according to the method given in Annex F, clause F.2.	Not applicable	N
9.3.4.1.5	Calibration of the test circuit		N
	The calibration of the test circuit is carried out by placing temporary connections B of negligible impedance as close as reasonably possible to the terminals provided for connecting the equipment under test.		N
9.3.4.1.6	Test procedure		P
	Tests for the performance under short-circuit conditions shall be made according to the requirements of the relevant product standard.	Pass muster	P
9.3.4.1.7	Behaviour of the equipment during short-circuit making and breaking tests	Pass muster	P
	There shall be neither arcing nor flashover between poles, or between poles and frame, and no melting of the fusible element F in the leakage detection circuit (see 8.3.4.1.2).	Pass muster	P
9.3.4.1.8	Interpretation of records		P
9.3.4.1.9	Condition of the equipment after the tests	Pass muster	P
9.3.4.2	Short-circuit making and breaking capacities	Pass muster	P
9.3.4.3	Verification of the ability to carry the rated short-time withstand current		P
	The test shall be made with the equipment in the closed position, at a prospective current equal to the rated short-time withstand current and the corresponding operational voltage under the general conditions of 8.3.4.1.		P
9.3.4.4	Co-ordination with short-circuit protective devices and rated conditional shortcircuit current		P

	Test conditions and procedures, where applicable, shall be stated in the relevant product standard.		P
9.4	Routine tests		P
	Routine tests shall be made on new and clean TSE and shall consist of:		---
	a) Verification of the operating mechanism as stated in 9.3.3.1		p
	b) Verification of controls, sequence and limits as stated in 9.3.3.2.4, 9.3.3.2.5 and 9.3.3.2.6		P
	c) Verification of dielectric withstand according to 8.3.3.4.2 of IEC 60947-1		P
9.5	EMC tests	See EMC test report	N

Annex A			
A.1	General		N
A.2	Rated duty		N
A.2.1	Intermittent periodic duty or intermittent duty		N
A.2.2	Temporary duty		N
A.3	Making and breaking capacities		N
A.4	Utilization category		N
A.5	Operational performance		N
A.6	Mechanical durability		N
A.7	Electrical durability		N
A.8	Verification of making and breaking capacities		N
A.9	Operational performance test		N
A.10	Special tests		N
A.10.1	Mechanical durability test		N
A.10.1.1	Condition of the equipment for tests		N
A.10.1.2	Operating conditions		N
A.10.1.3	Test procedure		N
A.10.1.4	Results to be obtained		N
A.10.2	Electrical durability test		N
Annex B			
4.4	Switching of capacitors or of tungsten filament lamps	No such components	N

7.1.7.1	Locking in the closed position for particular applications		N
7.1.7.2	Operating time of auxiliary contacts provided for interlocking		N
7.2.4.2 and Table 4	Increase of the operating rate for the verification of the operational performance		N
8.3.3.3.1	Time interval greater than $30\text{ s} \pm 10\text{ s}$ between close-open cycles for making and breaking capacity test of equipment of $I_{th} > 400\text{ A}$ For categories AC-23A and AC-23B testing of making and breaking capacities by make cycles at $10 I_e$ followed by the same number of make-break cycles at $8 I_e$		N
8.3.3.3.3	Verification of making and breaking capacities for utilization categories DC-22 and DC-23: replacement of the load of the test circuit by a motor		N
8.3.5.2.3	AC test circuit calibration for the short-circuit making capacity test in the case of d.c. equipment		N
Annex A	Utilization categories other than those listed in Table A.2		N
Table A.1	Switching of rotor circuits, capacitors or tungsten filament lamps		N
A.8	Verification of making and breaking capacities		N
A.9	Operational performance test		N
Annex C			
C.1	General		N
C.2	Tests		N
C.3	Test set-up and sequence		N
C.3.1	Making and breaking capacities (8.3.3.3) and operational performance (8.3.4.1)		N
C.3.2	Fuse protected short-circuit test (8.3.6.2)		N
C.4	Condition of equipment after tests		N
C.5	Instructions for use		N

Type of equipment: Automatic Transfer Switch

Details of:

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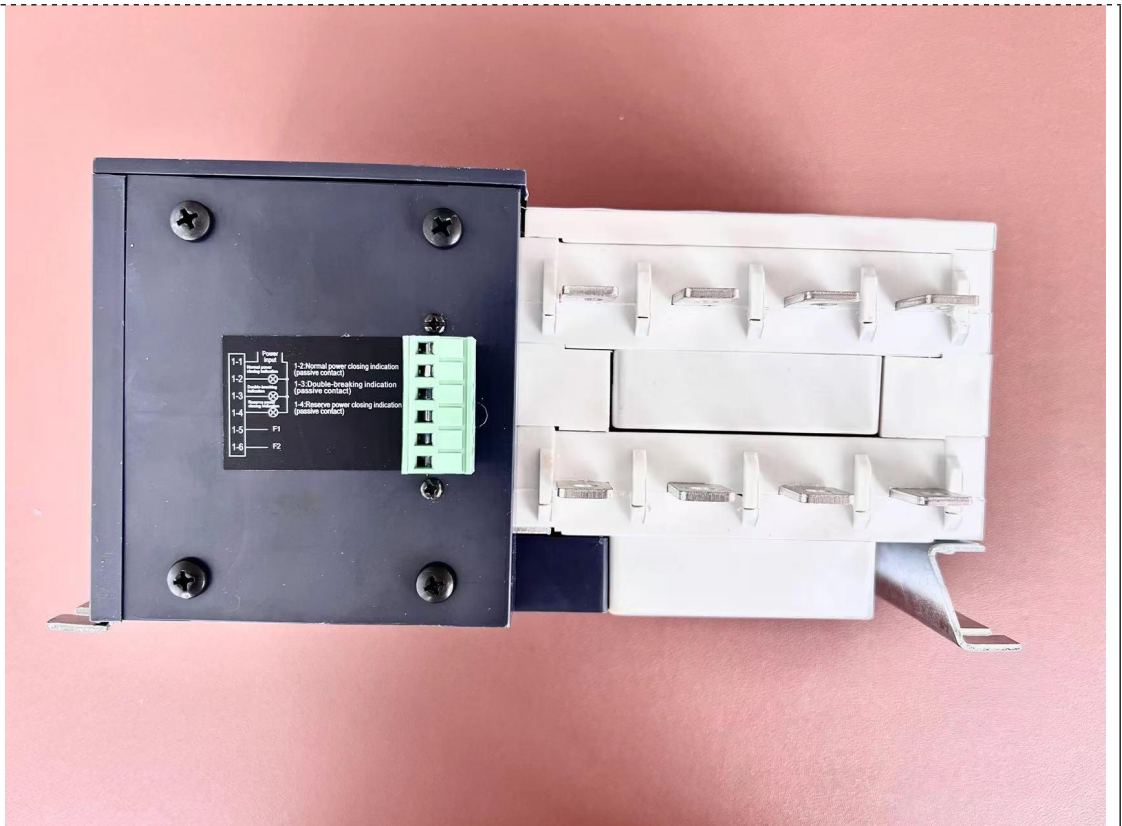
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Details of:

View:

- general
- front
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- bottom



Details of:

View:

general

front

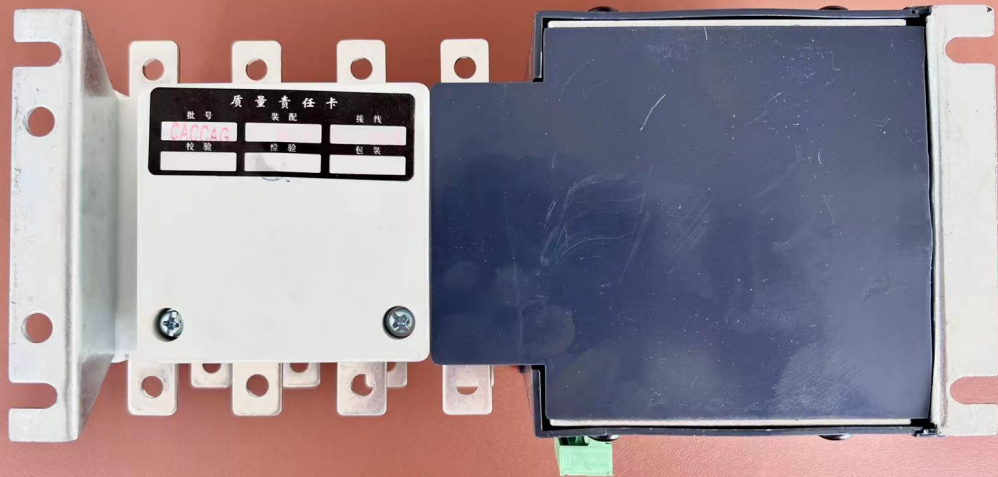
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Details of:

View:

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front

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