Test Report issued under the responsibility of:

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TEST REPORT
IEC 60947-6-1
Low-voltage switchgear and controlgear
Part 6-1: Multiple function equipment – Transfer switching equipment

Report Number.....:	**CN26J4PP 002**
Date of issue .....:	**23.03.2026**
Total number of pages.....:	**98**
Name of Testing Laboratory preparing the Report.....:	Hunan Electric Research Institute Testing Group Co., Ltd.
Applicant's name .....:	HIMEL HONG KONG LIMITED
Address .....:	11/F KERRY CTR, 683 KING'S RD QUARRY BAY, HONG KONG
Test specification:	
Standard.....:	IEC 60947-6-1:2021 for use in conjunction with IEC 60947-1:2020
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
TRF template used.....:	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No. .....:	IEC60947_6_1D
Test Report Form(s) Originator....:	SGS Fimko Ltd
Master TRF .....:	Dated 2021-11-01

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description..... :	Automatic Transfer Switching Equipment
Trade Mark(s)..... :	Himel
Manufacturer..... :	DELIXI ELECTRIC LTD
Model/Type reference..... :	HDQ1S-3200
Ratings..... :	Ue: AC400V(3P/4P); 50Hz,50/60Hz; Class PC; AC-32B, AC-33B; 3P,4P; Ui: 1000V; Uimp: 12kV; Icm: 105kA; Icw: 50kA/60ms; Ie: 2000A, 2500A, 3200A(AC-32B); Ie: 1000A, 1250A, 1600A(AC-33B);

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	**Hunan Electric Research Institute Testing Group Co., Ltd.**	
Testing location/ address.....:		**199 Xinxiangxi Road, Kunlunqiao Subdistrict, Xiangxiang City Xiangtan City Hunan Province China**	
Tested by (name, function, signature).....:		Jiang Wu, Test Engineer	Wu Jiang
Approved by (name, function, signature)...:		Bin Li, Approver	Li Bin
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation – 5pages (page 94-98)

Summary of testing:

There is no difference in the internal structure and material among the products with different rated current except the nameplates and dimensions of terminal busbar.

The controller models are divided into basic type, LED type and LCD type. The basic type is controlled by relay, and all electronic circuits are composed of passive components. LED type and LCD type have PCB.

3P and 4P have different length but the same width and height, with no difference between the poles.

The wiring methods include power top supply and bottom supply. The bottom supply method is represented by the D code. The product of bottom side is the power side I and power side II, and the top side is the load side, while the power top supply method is reverse. Other structure is identical.

All tests passed.

Tests performed (name of test and test clause):

Test sequence I: General performance characteristics

9.2.3.1 Constructional requirements
9.2.3.2 Operation
9.2.3.3 Controls, sequence and limits of operation
9.2.3.4 Tripping limits and characteristics
9.2.3.5 Temperature-rise
9.2.3.6 Dielectric properties

Test sequence II: Operating performance capability

9.2.4.1 Making and breaking capacities
9.2.4.2 Operational performance capability
9.2.4.3 Verification of dielectric withstand
9.2.4.4 Verification of temperature-rise
9.2.4.5 Verification of overload releases
9.2.4.6 Verification of main contact position

Test sequence III: Short-circuit performance capability

9.2.5.1 General requirements
9.2.5.2 Short-time withstand current
9.2.5.3 Short-circuit making capacity
9.2.5.4 Short-circuit breaking capacity
9.2.5.5 Verification of dielectric withstand
9.2.5.6 Verification of temperature-rise

Test sequence IV: Conditional short-circuit current

9.2.6.3 Conditional short-circuit current
9.2.6.4 Dielectric withstand verification
9.2.6.5 Temperature-rise verification

Test sequence VI: EMC

9.2.8 Electromagnetic compatibility

Test sample	Test sequence
HDQ1S-320042000DU HDQ1S-320043200GU HDQ1S-320042500PU	Test sequence I

Testing location:

Zhejiang Testing and Inspection Institute for Mechanical and Electrical Products Quality

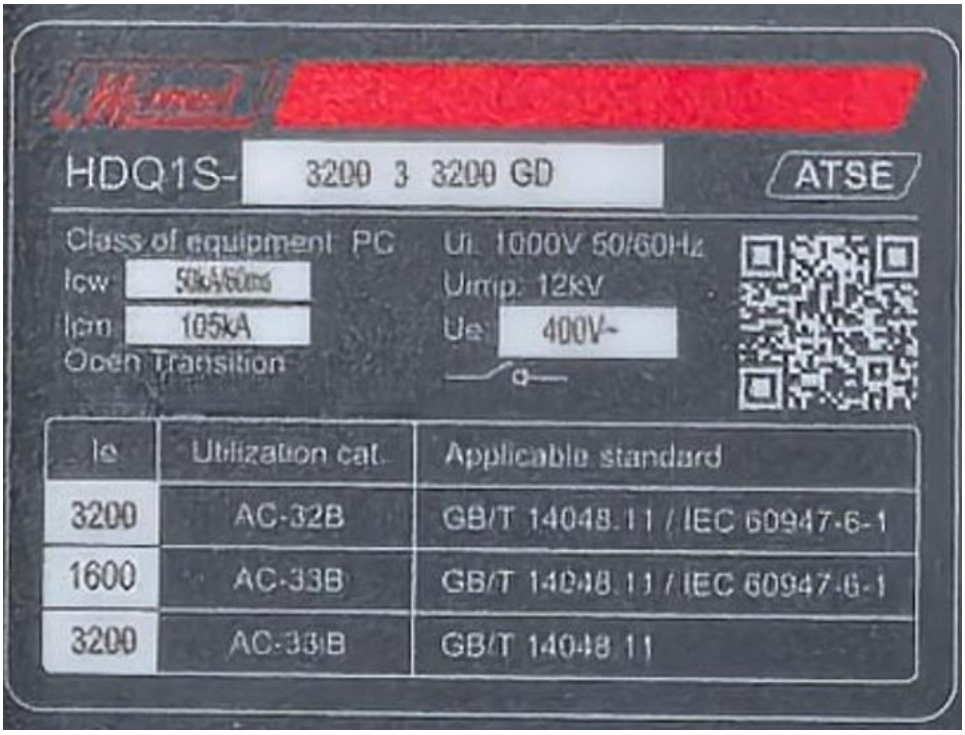
No. 125, Miaohouwang Road, Binjiang District, Hangzhou, Zhejiang, China.

HDQ1S-320042000DU HDQ1S-320043200DD	Test sequence II
HDQ1S-320042000DU HDQ1S-320043200DD	Test sequence III
HDQ1S-320042000DU HDQ1S-320043200GU	Test sequence VI

Summary of compliance with National Differences (List of countries addressed):

☒ **The product fulfils the requirements of EN IEC 60947-6-1:2023.**

Copy of marking plate:



Test item particulars .....:	
Type and characteristics of equipment .....:	HDQ1S-3200
- class of equipment.....:	PC / ~~CB / CC~~
- method of controlling .....:	~~MTSE / RTSE~~ / ATSE
- number of main contact positions.....:	~~two positions~~ / three positions
- suitability for isolation .....:	suitable / ~~not suitable~~
- transition type.....:	-
- number of poles.....:	3P, 4P
- neutral pole .....:	yes(for 4P) / no(for 3P)
- kind of current.....:	AC / ~~DC~~
- in case of alternating current, number of phases and the rated frequency.....:	50Hz, 50/60Hz
- type of interlock .....:	~~mechanical / electrical /~~ electrical-and-mechanical
- control functions.....:	-
- contact transfer time (ms).....:	0, 7s±20%
- in case of RTSE or ATSE, operating transfer time .....:	Basic type: 2, 2±10%; LED type: 2, 9s±10%; LCD type: 4, 06s±10%
- in case of ATSE, operating sequences.....:	automatic transfer, automatic return or not return
- pollution degree.....:	3
- EMC environment .....:	B
Rated and limiting values for the main circuit.....:	
- rated operational voltage Ue (V) .....:	AC400V
- rated insulation voltage Ui (V) .....:	1000V
- rated impulse withstand voltage Uimp (kV).....:	12kV
- conventional free air thermal current Ith (A).....:	2000A, 2500A, 3200A
- conventional enclosed thermal current Ithe (A) ..:	N/A
- rated operational current Ie (A).....:	AC-32B: 2000A, 2500A, 3200A AC-33B: 1000A, 1250A, 1600A
- rated uninterrupted current Iu (A).....:	N/A
- rated frequency (Hz).....:	50Hz, 50/60Hz
Short-circuit characteristics .....:	N/A
- rated short-time withstand current Icw (kA) .....:	50kA/60ms
- rated short-circuit making capacity Icm (kA).....:	105kA
- rated short-circuit breaking capacity Icn (kA) .....:	N/A
- rated conditional short-circuit current Iq or Icc (kA).....:	N/A
Utilization category .....:	AC-32B, AC-33B(t

Control circuits .....:	-
- type of current.....:	AC / ~~DC~~
- rated frequency or direct current.....:	50Hz, 50/60Hz
- rated control circuit voltage Uc (V).....:	AC230V
- rated control circuit supply voltage Us (V).....:	AC230V
- power consumption (W).....:	-
ATS controller.....:	
- monitored supply deviation.....:	Voltage (undervoltage and overvoltage transfer except for basic type) / frequency (only for LCD type)
- voltage deviations.....:	Undervoltage:187V; Overvoltage: 263V
- tolerance of the voltage deviations.....:	±10%
- frequency deviations .....:	50Hz: Under-frequency: 45Hz, Over-frequency: 55Hz; 60Hz: Under-frequency: 50Hz, Over-frequency: 65Hz;
- tolerance of the frequency deviations .....:	±2Hz
- time delays.....:	0-90s(except for basic type)
	-
Auxiliary circuits .....:	-
- rated operational voltage (V).....:	-
- rated frequency (Hz).....:	-
- number of circuits.....:	
- number and kind of contact elements .....:	-
	-
Motor operator supply circuits .....:	-
- rated operational voltage (V).....:	-
- rated frequency (Hz).....:	
- kind of protective device.....:	

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..... :	07.07.2025
Date (s) of performance of tests ..... :	07.07.2025 to 24.10.2025
General remarks:	
"(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.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	DELIXI ELECTRIC (WUHU) LTD / Wuhu Machinery Industrial Park, Wuhu city 241100 Anhui P.R. China

General product information and other remarks:

Type Designation: HDQ1S-3200

Rated operational voltage Ue: AC400V
Number of poles:3P, 4P
Rated frequency: 50Hz, 50/60Hz
Rated insulation voltage Ui: 1000V
Rated impulse withstand voltage Uimp: 12kV
Conventional free air thermal current Ith: 2000A, 2500A, 3200A
Rated operational current Ie: 2000A, 2500A, 3200A(AC-32B)
1000A, 1250A, 1600A(AC-33B)
Utilization category: AC-32B, AC-33B
Rated short-time withstand current Icw: 50kA/60ms
Rated short-circuit making capacity Icm: 105kA

Type Explanation:

HDQ1S –	3200	*	*	*	*
		1	2	3 4	5

1. Frame size rating current(A)
2. Number of poles
3. Rated current (A)
4. Controller type: Basic type: P; LED type: G; LCD type: D
5. Power top supply: U; Power bottom supply: D

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Clause	Requirement + Test	Result - Remark	Verdict

6	**PRODUCT INFORMATION**		
6.2	**Marking**		
	Visible; The marking on the product shall be visible to the operator after the product is installed		
1.1	Switching position, I – II or I – O – II	I – O – II	P
1.2	Suitability for isolation, where applicable, with the isolation function symbol according to IEC 60417-6169-1:2012-08		P
1.3	For RTSE or ATSE with off-load manual operations for maintenance purposes: “OFF- LOAD OPERATION ONLY, switch off all supply sources before operating manually”		N/A
	Marked; On equipment or nameplate		
2.1	Manufacturer’s name or trademark	Himel	P
2.2	Type designation or serial number	HDQ1S-3200	P
2.3	“IEC 60947-6-1”, indicating the product complies with this document	IEC 60947-6-1	P
2.4	Class of equipment (PC, CC, CB), method of controlling (MTSE, RTSE, ATSE) and transition type (open transition, closed transition)	Class PC, ATSE, open transition	P
2.5	Rated operational voltage(s) (Ue)	AC400V	P
2.6	Utilization categories and corresponding operational current(s) at the rated operational voltage	AC-32B:2000A, 2500A, 3200A AC-33B:1000A, 1250A, 1600A	P
2.7	Value of the rated frequency or the indication “DC” or the symbol ⎓ (IEC 60417-5031:2002-10)	50Hz, 50/60Hz	P
2.8	Rated short-time withstand current (Icw), if applicable	50kA/60ms	P
2.9	Rated short-circuit breaking capacities (Icn), if applicable		N/A
2.10	For ATSE and RTSE, rated control circuit supply voltage and frequency	230V, 50Hz, 50/60Hz	P
2.11	Rated impulse withstand voltage (Uimp)	12kV	P
2.12	Terminal designations and markings	4P: A, B, C, N; 3P: A, B, C	P
2.13	Degree of protection of enclosed equipment according to Annex C of IEC 60947-1:2020 if the degree of protection is different than IP00		N/A
2.14	Identification of neutral pole terminals, if applicable	N	P
2.15	For TSE including parts with stored charge components according to 8.1.8, a warning notice shall be provided on the product		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.16	For TSE Class CB, reference temperature for non-compensated thermal releases, if different than 30 °C		N/A
2.17	For TSE Class CB, range of the current settings (Ir) of the adjustable overload releases		N/A
2.18	For TSE Class CB, range of the rated instantaneous short-circuit current setting (Ii), for adjustable releases		N/A
	Literature; In provided literature		
3.1	Type of interlock	Electrical and Mechanical	P
3.2	Number of poles	3P, 4P	P
3.3	Rated short-circuit making capacities (Icm) for Class PC and Class CB, if applicable	105kA	P
3.4	Rated conditional short-circuit current (Iq or alternatively Icc) and associated SCPD, if applicable		N/A
3.5	Rated insulation voltage (Ui)	1000V	P
3.6	Number of main contact positions	3	P
3.7	For RTSE and ATSE, operating limits of electromechanical devices operating the main circuit	AC230V, 50Hz, 50/60Hz	P
3.8	For ATSE, monitored supply deviations and operating limits	See table	P
3.9	Auxiliary circuits characteristics		N/A
3.10	For ATSE, operating sequence	automatic transfer, automatic return or not return	P
3.11	Contact transfer time, operating transfer time and additional information including time delays with their position in the operating sequence, if any	See table	P
3.12	EMC Environment A or B	B	P
3.13	Conductor strip length		N/A
3.14	Maximum number of conductors which may be clamped	1	P
3.15	Conductor designation for non-universal screwless terminals		N/A
3.16	References of minimum mandatory component of the complete unit which are required for the TSE		P
3.17	Control functions		P
3.18	Wiring diagram		N/A
3.19	Dedicated wiring accessories, if applicable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.20	For TSE Class CB - tripping/time characteristic - temperature/current characteristic, if applicable		N/A
	All controls accessible to the operator shall be marked to indicate their function		P
6.3	**Instructions for installation, operation and maintenance, decommissioning and dismantling**		
	Subclause 6.3 of IEC 60947-1:2020 applies with the following additions;		
	The instructions shall also cover the dedicated wiring accessories, if applicable		P
	For TSE tested according to this document and delivered to the customer unassembled or partially assembled, the TSE manufacturer shall provide instructions for proper assembly, wiring, marking, any remaining routine tests as defined in 9.3, commissioning, operation and maintenance of the TSE.		P
	For sensing cables and bridging conductors not supplied with the TSE or not made available as a type tested accessory, the manufacturer shall provide instructions on how to fabricate.		P
	The operation manual of the TSE shall include the description of the operating sequences.		P
6.4	**Environmental information**		
	When required, material declarations shall be established according to Annex W of IEC 60947-1:2020.		N/A
7	**NORMAL SERVICE, MOUNTING AND TRANSPORT CONDITIONS**		
	Clause 7 of IEC 60947-1:2020 applies		
7.1	**Normal service conditions**		
7.1.1	Ambient air temperature		
	The ambient air temperature does not exceed +40 °C and its average over a period of 24 h does not exceed +35 °C. The lower limit of the ambient air temperature is –5 °C.		P
7.1.2	Altitude		
	The altitude of the site of installation does not exceed 2 000 m.		P
7.1.3	Atmospheric conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
7.1.3.1	Humidity		P
7.1.3.2	Pollution degree		P
7.1.4	Shock and vibration		N/A
	Standard conditions of vibration are defined in footnote b of Table Q.1 of IEC 60947-1:2020		N/A
7.2	**Conditions during transport and storage**		
	Between –25 °C and +55 °C and, for short periods not exceeding 24 h, up to +70 °C		P
7.3	**Mounting**		
	The equipment shall be mounted in accordance with the manufacturer's instructions.		P
	Rail mounting shall be specified according to IEC 60715:2017, if applicable.		P
8	**CONSTRUCTIONAL AND PERFORMANCE REQUIREMENTS**		
8.1	**Constructional requirements**		
8.1.1	General Subclause 8.1 of IEC 60947-1:2020 applies with additions:		
	Where the product is intended to be used together with specific auxiliary equipment and dedicated wiring accessories, the safety evaluation and test shall include this auxiliary equipment and accessories unless it can be shown that it does not affect the safety of any equipment.		P
	The accessible part of the device and especially the operating means shall not present sharp edges and corners which can injure the operator.		P
	The minimum components which shall be verified by the manufacturer as a complete unit to achieve compliance as a TSE are defined in 5.2 item n):		P
	For sensing cables and bridging conductors not supplied with the TSE or not made available as a type tested accessory, the manufacturer shall provide instructions on how to fabricate.		P
	Where different ratings are declared for position I and position II, each position shall be tested.		N/A
	For CC class TSE, standard conditions of vibration are defined in footnote b of Table Q.1 of IEC 60947-1:2020.		N/A
8.1.2	Materials Subclause 8.1.2 of IEC 60947-1:2020 applies		
8.1.2.1	General material requirements		

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Clause	Requirement + Test	Result - Remark	Verdict
	Parts of insulating materials which might be exposed to thermal stresses due to electrical effects within the equipment shall not be adversely affected by abnormal heat and by fire.		P
	The manufacturer shall specify which test method, 8.1.2.2 or 8.1.2.3, is to be used ..... :		P
8.1.2.2	Glow wire testing		
	The suitability of materials used is verified by:		
	a) making tests on the equipment		N/A
	b) making tests on sections taken from the equipment		P
	c) making tests on any parts of identical material having representative thickness		N/A
	d) providing data from the insulating material supplier fulfilling the requirements according to IEC 60695-2-12.		N/A
	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 850 °C or 960 °C		
	Test temperature (°C)..... :	960°C	P
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		P
	No ignition of the tissue paper		P
	When tests on the equipment or on sections taken from the equipment are used, test temperature:		
	850 °C for class CC TSE		N/A
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A
	960 °C for class CB TSE		N/A
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A
	960 °C for class PC TSE		N/A
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C		

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Clause	Requirement + Test	Result - Remark	Verdict
	No visible flame and no sustained glowing		N/A
	Flames and glowing extinguish within 30 s		N/A
	No ignition of the tissue paper		N/A
8.1.2.3	Test based on flammability category		
	For parts of insulating materials, hot wire ignition and, where applicable, arc ignition tests as specified in 9.2.2.2, shall be made based on flammability category.		N/A
	Tests on materials are made in accordance with Annex M.		N/A
	The hot wire ignition (HWI) and arc ignition (AI) test value requirements related to the material flammability category shall conform to Table M.1 or M.2.		N/A
	Alternatively, the manufacturer may provide data from the insulating material supplier fulfilling the requirements given in Annex M.		N/A
8.1.3	Indication of the switching position		
	I (IEC 60417-5007:2002-10) for ON (source I)		P
	O (IEC 60417-5008:2002-10) for power OFF		P
	II (IEC 60417-6176:2012-11) for ON (source II)		P
8.1.4	Equipment suitable for isolation Subclauses 8.1.7 and 8.2.7 of IEC 60947-1:2020 applies		
8.1.7 part 1 and part 3	Additional requirements for equipment suitable for isolation		
8.1.7.1	Additional constructional requirements		
	- 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 13, Part 1) (mm) .....:	14mm	—
	- measured clearances (mm) .....:	Min 22, 4mm	P
	- test Uimp across gap (kV) .....:	18, 5kV	P
8.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers		
	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 .....:		

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Clause	Requirement + Test	Result - Remark	Verdict
	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
8.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position		
	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) .....:		
	Rated impulse withstand voltage (kV) .....:		
	Test Uimp on open main contacts at the test force		N/A
8.2.7 part 1	Leakage currents of equipment suitable for isolation		
	Equipment suitable for isolation, leakage current not exceed 0, 5 mA		
	Test voltage 1, 1 Ue (V).....:	440V	P
	Measured leakage current (mA).....:	<0, 1mA	P
8.1.5	Opening and closing of main contacts		
	The main moving contacts of all phase poles of the switching device of a multipole TSE shall be so mechanically coupled that they make and break substantially together, whether operated manually, remotely, or automatically.		P
	The manual actuator of the TSE shall be insulated. The requirements of 8.1.5.1 of IEC 60947-1:2020 applies.		P
8.1.5.1 part 1	Insulation		
	Actuator insulated from live parts for		
	- rated insulation voltage (V) .....:	1000V(main circuit), 250V(control and auxiliary circuit)	P
	- rated impulse withstand voltage (kV).....:	12kV(main circuit), 2, 5kV(control and auxiliary circuit)	P
	Actuator made of metal		
	- connected to a protective conductor or provided with an additional reliable insulation		N/A
	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.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	There shall be no path or opening which allows incandescent particles to be discharged from the area of the manual operating means.		P
	For TSE equipped with neutral poles, 8.1.9 of IEC 60947-1:2020 applies.		P
8.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	Equipment provided with a pole intended for the connection of neutral, this pole shall be clearly marked by the letter “N”.	N	P
	The switched neutral pole does not break before and does not make after the other poles except		P
	- a pole having the appropriate short-circuit breaking and making capacity is used as neutral pole, all poles may operate together		N/A
	Conventional thermal current of neutral pole		P
	For any TSE with manual operating means intended for on-load use, opening and closing of the main contacts shall be independent of the speed with which the manual operating means is operated unless:		P
	Manual means is intended only for off-load use with all sources de-energized and is so marked according to Table 2 item 1.3.		P
8.1.6	Clearances and creepage distances Subclause 8.1.4 of IEC 60947-1:2020 applies		
8.1.4.1 part 1	General		
	Clearances:		
	- Uimp is given as:	12kV	
	- max. value of rated operational voltage to earth:	-	
	- nominal voltage of supply system:	-	
	- overvoltage category:	III	
	- pollution degree:	3	
	- field-in or homogeneous:		
	- minimum clearances (mm).....:	14mm	
	- measured clearances (mm) .....:	see appended table 8.1.6	P
	Creepage distances:		
	- rated insulation voltage Ui (V) .....:	1000V	
	- pollution degree.....:	3	
	- comparative tracking index (V).....:	175V	
	- material group .....:	IIIa	

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Clause	Requirement + Test	Result - Remark	Verdict
	- minimum creepage distances (mm)..... :	16mm	
	- measured creepage distances (mm) ..... :	see appended table 8.1.6	P
8.1.4.2 part 1	Insulation coordination barriers for creepage distances		
	When solid insulation is used as an insulation coordination barrier to comply with required creepage distances, the material used shall comply with the glow wire requirements in 8.1.2.2 or the flammability requirements in 8.1.2.3.		N/A
8.1.4.3 part 1	Insulation coordination barriers for clearance distances		
	When solid insulation is used as an insulation coordination barrier to comply with required clearance distances and does not physically support or maintain the relative position of uninsulated parts involved, the barrier material shall comply with the glow wire requirements in 8.1.2.2 and shall conform to the glow-wire test requirements of 9.2.2.1 at a temperature of 650 °C or the AI values in Table M.2. Or alternatively:		N/A
	The material shall comply with the requirements in 8.1.4.2.		N/A
	Where SELV and PELV circuits of the complete TSE are accessible, they shall be separated from other hazardous live-part according to the requirements of Annex N of IEC 60947-1:2020.	see appended table 8.1.6	N/A
8.1.7	Provision for protective earthing Subclause 8.1.10 of IEC 60947-1:2020 applies		
8.1.10.1 part 1	Constructional requirements		
	The exposed conductive parts other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an protective earthing conductor.		P
	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly.		P
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm × 50 mm) or are so located as to exclude any contact with live parts.		N/A
8.1.10.2 part 1	Protective earth terminal		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the protective earthing conductor is maintained when the cover or any other removable part is removed.		P
	The protective earth terminal shall be suitably protected against corrosion.		P
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts of the equipment and the metal sheathing of connecting conductors.		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor, PEM conductor or PEL conductor. In this case, it shall also have the function of a neutral terminal, mid terminal or earthed line terminal in addition to meeting the requirements applicable to the protective earth terminal.		N/A
8.1.10.3 part 1	Protective earth terminal marking and identification		
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, PEN, PEM or PEL, as applicable, in accordance with 7.3 of IEC 60445:2017, or by a graphical symbol for use on equipment.		P
	The graphical symbol to be used is the symbol 60417-5019 (2006-08) ⏚ Protective earth (ground) in accordance with the IEC 60417 database.		P
8.1.10.4 part 1	Protective earth continuity		
	All exposed conductive parts of the equipment and/or its enclosure shall be effectively connected to the terminal for the incoming external protective conductor.		P
	The resistance of the circuit from the exposed conductive part to the protective earth terminal shall not exceed 0, 1 Ω.		P
8.1.8	Stored charge energy circuit		
	Parts including stored charge (capacitors) that are removable for servicing (such as coil replacement), installation, or disconnection shall present no risk of electric energy hazard after disconnection.		N/A

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Capacitors connected to accessible hazardous live parts shall be discharged to an energy level less than 0, 5 mJ within 5 s after the removal of power. Otherwise:		N/A
	- readily visible warning notice shall be provided on the product, indicating the time of discharge to the limit values or		N/A
	- preferable method how to discharge the capacitor before touching the connecting parts		N/A
8.1.9	Stored energy closing		
	The stored energy closing mechanism shall be capable of ensuring the operation of TSE in any condition between no-load and its rated making capacity.		N/A
	When the stored energy is retained within the TSE, a device shall be provided which indicates when the storing mechanism is fully charged. A device shall also be provided to indicate when the storing mechanism is not charged sufficiently to allow operation. These charge indications shall be operational with and without the availability of electrical power.		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating when the auxiliary supply voltage is between 85 % and 110 % of the rated control supply voltage.		N/A
	It shall not be possible for the moving contacts to move from the open position unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	When the energy storing mechanism is manually operated, the direction of operation shall be indicated. This requirement does not apply to TSE with an independent manual closing operation.		N/A
8.1.10	Dedicated enclosures for TSE Subclause 8.1.11 of IEC 60947-1:2020 applies		
8.1.11.1 part 1	Design		
	When the enclosure is opened, all parts requiring access for installation and maintenance are readily accessible.		P
	Sufficient space is provided inside the enclosure.		P

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		P
	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.		P
	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.		P
	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
8.1.11.2 part 1	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
8.1.12 part 1	Degrees of protection of enclosed equipment		
	Degree of protection .....:	IPXX	
	Test for first characteristic:	IPXX	
	Test for first numeral (1, 2, 3, 4, 5, 6) .....:		N/A
	Test for second characteristic:	IPXX	
	Test for second numeral (1, 2, 3, 4, 5, 6, 7, 8, 9).....:		N/A
8.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending.		N/A
	Compliance verified by the test of 9.2.8.		
8.1.8 part 1	Terminals		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.1.8.1	Constructional requirements		
	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength.	See clause 9.2.5	P
	Terminal connections shall be such that the force to connect the conductors may be applied by screws, screwless-type or other equivalent means so as to ensure that the necessary contact pressure is maintained.	See clause 9.2.5	P
	Terminals shall be so constructed that the conductors can be clamped between suitable surfaces without any significant damage either to conductors or terminals.	See clause 9.2.5	P
	Terminals shall not allow the conductors to be displaced or be displaced themselves in a manner detrimental to the operation of equipment and the insulation voltage shall not be reduced below the rated values.	See clause 9.2.5	P
	If required by the application, terminals and conductors may be connected by means of cable lugs for copper conductors only (see Table P.1).		N/A
	Screwless-type clamping units, unless otherwise specified by the manufacturer, shall accept solid, stranded and flexible conductors as indicated in Table 1.		N/A
	On screwless-type clamping unit, the connection or disconnection of conductors shall be made as follows:		
	- on universal clamping units by the use of a general purpose tool or a convenient device, integral with the clamping unit to open it for the insertion or withdrawal of the conductors		N/A
	- on push-wire clamping units by simple insertion. For the disconnection of the conductors an operation other than a pull only on the conductor shall be necessary. The use of a general purpose tool or of a convenient device, integral with the clamping unit is allowed in order to "open" it and to assist the insertion or the withdrawal of the conductor.		N/A
8.1.8.2	Connecting capacity		
	Type of conductors ..... :	prepared conductor	
	Minimum cross-section of conductor (mm²) ..... :	3×(100×5)	
	Maximum cross-section of conductor (mm²)..... :	4×(100×10)	
	Number of conductors simultaneously connectable to the terminal ..... :	1	
8.1.8.3	Connection		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 although they may hold the terminals in place or prevent them from turning.		P
8.1.8.4	Terminal identification and marking		
	Terminals intended exclusively for the neutral conductor shall be identified by the letter "N".		P
	The protective earth terminal shall be identified in accordance with 8.1.10.3.		P
	Other terminals		N/A
9.2.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS I-1, HDQ1S-320042000DU**		
9.2.3.1	**Compliance with constructional requirements**		
9.2.5 part 1	Mechanical and electrical properties of terminals		
9.2.5.2	Tests of mechanical strength of terminals		
	Maximum cross-section of conductor (mm²).....:	3×(100×5)	
	Diameter of thread (mm).....:	M12	
	Torque (Nm).....:	15, 4Nm	
	5 times on 2 separate clamping units		P
	During the test, clamping units and terminals shall not work loose and there shall be no damage.		P
9.2.5.3 9.2.5.4	Testing for damage to and accidental loosening of conductor (flexion test) Pull-out test		
a)	Conductor of the minimum cross-section (mm²).....:		
	Number of conductors of the minimum 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		
	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
b)	Conductor of the maximum cross-section (mm²).....:		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Number of conductors of the maximum 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		
	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
c)	Conductor of the minimum and maximum cross-section (mm²) ..... :		
	Number of conductors of the minimum cross-section, number of conductors of the maximum 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		
	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
9.2.5.7	Electrical performance of screwless-type clamping units		
	Subclauses 9.8 of IEC 60999-1:1999 and 9.8 of IEC 60999-2:2003 apply.	See Attachment XX	N/A
9.2.5.8	Ageing test for screwless-type clamping units		
	Subclauses 9.10 of IEC 60999-1:1999 and 9.10 of IEC 60999-2:2003 apply	See Attachment XX	N/A
9.2.8 part 1	Conduit pull-out test, torque test and bending test with metallic conduits		
9.2.8.2	Pull-out test		
	Torque (Nm)..... :		
	Force (N), applied for 5 min..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	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/A
9.2.8.3	Bending test		
	Bending moment (Nm), applied for 1min.....:		
	After the test there shall be no evidence of damage impairing further use of the enclosure.		N/A
9.2.8.4	Torque test		
	Torque (Nm).....:		N/A
	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/A
9.2.9 part 1	Test of earth continuity for protective earth		
9.2.9.2	Earth continuity test		P
9.2.3.2	**Operation**		
9.2.3.2.1	General		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.	See Attachment XX	N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.3.2.2	Interlocking function verification		
9.2.3.2.2.2	Manual operation		
	The test performed without any electrical power available.		P
	For TSE equipped with a single manual actuator:		
	When the actuator is moved from position I to position II, it shall be verified that the terminals of source I are disconnected from the load terminals before the source II terminals are connected to the load terminals. The test shall be repeated from position II to position I.		P

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	With source I switching device in closed position, it shall be verified that source II switching device cannot be manually switched to closed position;		N/A
b)	With source II switching device in closed position, it shall be verified that source I switching device cannot be manually switched to closed position;		N/A
c)	With source I and source II switching devices both in open position, it shall be verified that simultaneous closing operations do not result in the closure of both switching devices at any time.		N/A
9.2.3.2.2.3	Electrically controlled operation		
	Following tests made with control circuit supply voltage 85 % and 110 % of rated value.		P
	If the interlock of the TSE requires electrical power, the test shall be conducted with this power supply connected and disconnected.		P
	For TSE equipped of a single remote actuator:		
	When a remote order to transfer from position I to position II is applied, it shall be verified that the load terminals are disconnected from source I terminals before being connected to source II terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped of distinct remote actuators for each switching device. Following sequence shall be verified:		
a)	With source I and source II switching devices in the open position, it shall be verified that giving the order to switch both switching devices to close simultaneously for 5 s does not result in the closure of both devices. This test is applicable only to RTSE and ATSE allowing to send simultaneous transfer orders to position I and position II.		N/A
b)	With source I switching device in closed position, it shall be verified that sending a remote closing order on source II switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
c)	With source II switching device in closed position, it shall be verified that sending a remote closing order on source I switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
9.2.3.2.3	Verification of the robustness of the interlock		
9.2.3.2.3.1	General		

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Clause	Requirement + Test	Result - Remark	Verdict
	The test shall be conducted in both position I and position II of the TSE.		P
	If the construction of the TSE is such that there is no significant physical difference between position I and position II that would influence the test results, the tests can be done in either position I or II.		P
	If it can be determined that one position represents a more difficult case, the tests are only required to be done in that position.		N/A
	MTSE shall be tested using manual operation means.		N/A
	RTSE and ATSE shall be tested using remote operation means, and manual operation means if applicable.		N/A
9.2.3.2.3.2	Manual operation		
	The test performed without any electrical power available.		P
	- actuator type (fig.)..... :		
	- actuating force from one position to another (N).... :	151N	
	- test force with blocked main contacts (N)..... :	453N	
	- used method to keep the contact closed..... :	Welding	
	For TSE equipped with a single manual actuator:		
	Test force applied 10s in the direction to open the contacts previously fixed together and close the other source switching device.		P
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	Test force applied 10s in the direction to open the contacts previously fixed together.		N/A
b)	Other source switching device cannot be manually switched to the closed position.		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.3	Dependent power operation		
	RTSE and ATSE with dependent power operation the TSE shall be closed in position I.		N/A
	- used method to keep the contact closed..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A
	- 110% supply voltage to the power operator applied .....:		N/A
	- three attempts to operate at 5min intervals .....:		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.4	Independent power operation		
	RTSE and ATSE with independent power operation the TSE shall be closed in position I.		P
	- used method to keep the contact closed.....:	Welding	
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A
	- stored energy of the power operator released (3 times).....:		P
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
9.2.3.2.4	Verification of electrical interlock in case of individual failure		
	Applies when the equipment is equipped with only electrical interlock, or with only electrically driven mechanical interlock, and no mechanical interlock.		N/A
	Verification of 8.2.1.2 c) shall be performed using:		
	- FMEA according to IEC 60812 or		N/A
	- by simulating any possible individual failure .....:		N/A
9.2.3.2.5	Verification of the contact transfer time		
	TSE having a single mechanical operating handle:		
	Handle operating speed 1 m/s ± 25%	1, 09m/s	P
	Contact transfer time (ms).....:	756ms	P
	TSE having mechanical operating means requiring multiple motions to complete the transfer:		
	Handle operating speed 1 m/s ± 25%		N/A
	Contact transfer time (ms).....:		N/A
	ATSE or RTSE:		
	100% control circuit supply voltage.....:		P
	Contact transfer time (ms).....:	767ms	P
9.2.3.3.	**Controls, sequence and limits of operation**		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.2.3.3.2	Operation on loss of supply voltage		
	ATSE provided with adjustable time delay(s): Tested with minimum and maximum values.	0s-90s	P
	With one of the monitored phases of source I disconnected, for a duration shorter than the corresponding time-delay, the ATSE shall not transfer.		P
	With one of the monitored phases of source I disconnected, for a duration longer than the corresponding time-delay if applicable, the ATSE shall transfer to position II. Transfer time shall be within the limits specified by the manufacturer.		P
	With the source I phase reconnected, the ATSE shall either return to position I, if set to "automatic return" mode, or stay in position II if set to "non-automatic return" mode.		P
	Tested for each monitored source supply with each of the monitored source conductors disconnected in turn.	see appended table 9.2.3.3.2	P
9.2.3.3.3	Operation on deviation of source I supply characteristics		
	ATSE provided with adjustable time delay(s): Tested with minimum value.	0s	P
	ATSE provided with adjustable deviation limits: Tested with minimum and maximum values.	Undervoltage: 187V Overvoltage: 263V	P
	Declared supply characteristic monitored on each terminal of source I shall be altered in turn to the values and tolerances as stated by the manufacturer and then restored to the original value:		
	- for voltage limits	see appended table 9.2.3.3.3	P
	- for frequency limits	see appended table 9.2.3.3.3	P
	- by altering the supply characteristic on all the phases simultaneously and by restoring it to its original value	see appended table 9.2.3.3.3	P
	During each of the tests, the ATSE:		
	- shall not transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value within the deviation limits		P
	- shall transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value outside of the deviation limits		P
	- shall either return to position I when the supply characteristic is restored, if set to "automatic return" mode, or stay in position II if set to "non-automatic return" mode		P

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.3.3.4	Operation on deviation of source II supply characteristics		
a)	For voltage supply deviation monitoring:		
	Transfer from position I to position II occurs within the source II voltage limits stated by the manufacturer:		
	- by increasing source II voltage starting from below the value stated by the manufacturer	see appended table 9.2.3.3.4	P
	- if overvoltage monitoring provided, by decreasing source II voltage starting from above the value stated by the manufacturer	see appended table 9.2.3.3.4	P
b)	For voltage and frequency deviation monitoring:		
1)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
2)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
3)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
4)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
9.2.3.3.5	Operation with in-phase transfer control function		
	If the ATSE is provided with deviation limits for in-phase voltage, frequency and phase angle, the test shall be made once with the limit set to the minimum value, and once with the limit set to the maximum value for adjustable units.		N/A
	When deviation limits are fixed, same tests shall be done within the specified limits.		N/A
	Transfer from one position to another occurs within the limits stated by the manufacturer.	see appended table 9.2.3.3.5	N/A
9.2.3.4	**Tripping limits and characteristics**		
	The tripping limits and characteristics of CB type TSE shall be verified according to 8.3.3.2 of IEC 60947-2:2016, IEC 60947-2:2016/AMD1:2019.	See Attachment XX	N/A
9.2.3.5	**Temperature-rise**		
	ambient temperature 10-40 °C ..... :	22, 8°C	
	test enclosure W x H x D (mm x mm x mm) ..... :		
	material of enclosure ..... :		
	control circuit supply voltage (V) ..... :	110%Us	
	Main circuits, test conditions:		
	- rated operational current Ie (A) ..... :	2000A	
	- conventional thermal current Ith (A) ..... :	2000A	

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Clause	Requirement + Test	Result - Remark	Verdict
	- conventional enclosed thermal current Ithe (A) .....:		
	- cable / busbar cross-section (mm^2) / length (mm)..:	3×(100×5)	
	Tested position:	position I	
	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).....:		
	Measured temperature-rise.....:	see appended table 9.2.3.5	P
	Auxiliary circuits, test conditions:		
	- rated operation current (A).....:		
	- cable cross-section (mm^2).....:		
	Measured temperature-rise.....:	see appended table 9.2.3.5	N/A
9.2.3.6	**Dielectric properties**		
	Verification of impulse withstand voltage		
	Rated impulse withstand voltage (kV).....:	14, 8kV(main circuit); 2, 2,5kV(control and auxiliary circuit)	
	- test Uimp main circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp auxiliary circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp control circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp on open main contacts (equipment suitable for isolation) (kV).....:	see appended table 9.2.3.6 a)	P
	Power-frequency or DC withstand verification		
	- rated insulation voltage Ui (V) .....:	1000V(maincircuit); 250V(control circuit)	P
	- main circuits, test voltage for 1 min. (V) .....:	see appended table 9.2.3.6 b)	P
	- auxiliary circuits, test voltage for 1 min (V).....:	see appended table 9.2.3.6 b)	N/A
	- control circuits, test voltage for 1 min (V) .....:	see appended table 9.2.3.6 b)	P
	Devices, which have been disconnected for the power-frequency withstand voltage test.....:		P
	Equipment suitable for isolation, leakage current not exceed 0, 5 mA		
	Test voltage 1, 1 Ue (V).....:	440V	P
	Measured leakage current (mA).....:	<0,1mA	P

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS I-2, HDQ1S-320043200GU**		
9.2.3.1	**Compliance with constructional requirements**		
9.2.5 part 1	Mechanical and electrical properties of terminals		
9.2.5.2	Tests of mechanical strength of terminals		
	Maximum cross-section of conductor (mm²).....:	4×(100×10)	
	Diameter of thread (mm).....:	M12	
	Torque (Nm).....:	15, 4Nm	
	5 times on 2 separate clamping units		P
	During the test, clamping units and terminals shall not work loose and there shall be no damage.		P
9.2.5.3 9.2.5.4	Testing for damage to and accidental loosening of conductor (flexion test) Pull-out test		
a)	Conductor of the minimum cross-section (mm²).....:		
	Number of conductors of the minimum 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		
	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
b)	Conductor of the maximum cross-section (mm²).....:		
	Number of conductors of the maximum 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		
	Force (N), applied for 1 min.....:		

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit.		N/A
c)	Conductor of the minimum and maximum cross-section (mm²) ..... :		
	Number of conductors of the minimum cross-section, number of conductors of the maximum 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		
	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
9.2.5.7	Electrical performance of screwless-type clamping units		
	Subclauses 9.8 of IEC 60999-1:1999 and 9.8 of IEC 60999-2:2003 apply.	See Attachment XX	N/A
9.2.5.8	Ageing test for screwless-type clamping units		
	Subclauses 9.10 of IEC 60999-1:1999 and 9.10 of IEC 60999-2:2003 apply	See Attachment XX	N/A
9.2.8 part 1	Conduit pull-out test, torque test and bending test with metallic conduits		
9.2.8.2	Pull-out test		
	Torque (Nm)..... :		
	Force (N), applied for 5 min..... :		
	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/A
9.2.8.3	Bending test		
	Bending moment (Nm), applied for 1min..... :		
	After the test there shall be no evidence of damage impairing further use of the enclosure.		N/A
9.2.8.4	Torque test		
	Torque (Nm)..... :		N/A
	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/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.9 part 1	Test of earth continuity for protective earth		
9.2.9.2	Earth continuity test	see appended table 8.1.10.4	P
9.2.3.2	**Operation**		
9.2.3.2.1	General		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.	See Attachment XX	N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.3.2.2	Interlocking function verification		
9.2.3.2.2.2	Manual operation		
	The test performed without any electrical power available.		P
	For TSE equipped with a single manual actuator:		
	When the actuator is moved from position I to position II, it shall be verified that the terminals of source I are disconnected from the load terminals before the source II terminals are connected to the load terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	With source I switching device in closed position, it shall be verified that source II switching device cannot be manually switched to closed position;		N/A
b)	With source II switching device in closed position, it shall be verified that source I switching device cannot be manually switched to closed position;		N/A
c)	With source I and source II switching devices both in open position, it shall be verified that simultaneous closing operations do not result in the closure of both switching devices at any time.		N/A
9.2.3.2.2.3	Electrically controlled operation		
	Following tests made with control circuit supply voltage 85 % and 110 % of rated value.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If the interlock of the TSE requires electrical power, the test shall be conducted with this power supply connected and disconnected.		P
	For TSE equipped of a single remote actuator:		
	When a remote order to transfer from position I to position II is applied, it shall be verified that the load terminals are disconnected from source I terminals before being connected to source II terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped of distinct remote actuators for each switching device. Following sequence shall be verified:		
a)	With source I and source II switching devices in the open position, it shall be verified that giving the order to switch both switching devices to close simultaneously for 5 s does not result in the closure of both devices. This test is applicable only to RTSE and ATSE allowing to send simultaneous transfer orders to position I and position II.		N/A
b)	With source I switching device in closed position, it shall be verified that sending a remote closing order on source II switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
c)	With source II switching device in closed position, it shall be verified that sending a remote closing order on source I switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
9.2.3.2.3	Verification of the robustness of the interlock		
9.2.3.2.3.1	General		
	The test shall be conducted in both position I and position II of the TSE.		P
	If the construction of the TSE is such that there is no significant physical difference between position I and position II that would influence the test results, the tests can be done in either position I or II.		P
	If it can be determined that one position represents a more difficult case, the tests are only required to be done in that position.		N/A
	MTSE shall be tested using manual operation means.		N/A
	RTSE and ATSE shall be tested using remote operation means, and manual operation means if applicable.		N/A
9.2.3.2.3.2	Manual operation		

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Clause	Requirement + Test	Result - Remark	Verdict
	The test performed without any electrical power available.		P
	- actuator type (fig.).....:		
	- actuating force from one position to another (N)....:	157N	
	- test force with blocked main contacts (N).....:	471N	
	- used method to keep the contact closed.....:	Welding	
	For TSE equipped with a single manual actuator:		
	Test force applied 10s in the direction to open the contacts previously fixed together and close the other source switching device.		P
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	Test force applied 10s in the direction to open the contacts previously fixed together.		N/A
b)	Other source switching device cannot be manually switched to the closed position.		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.3	Dependent power operation		
	RTSE and ATSE with dependent power operation the TSE shall be closed in position I.		N/A
	- used method to keep the contact closed.....:		
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A
	- 110% supply voltage to the power operator applied .....:		N/A
	- three attempts to operate at 5min intervals .....:		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.4	Independent power operation		
	RTSE and ATSE with independent power operation the TSE shall be closed in position I.		P
	- used method to keep the contact closed.....:	Welding	
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- stored energy of the power operator released (3 times).....:		P
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
9.2.3.2.4	Verification of electrical interlock in case of individual failure		
	Applies when the equipment is equipped with only electrical interlock, or with only electrically driven mechanical interlock, and no mechanical interlock.		N/A
	Verification of 8.2.1.2 c) shall be performed using:		
	- FMEA according to IEC 60812 or		N/A
	- by simulating any possible individual failure .....:		N/A
9.2.3.2.5	Verification of the contact transfer time		
	TSE having a single mechanical operating handle:		
	Handle operating speed 1 m/s ± 25%	1, 11m/s	P
	Contact transfer time (ms).....:	768ms	P
	TSE having mechanical operating means requiring multiple motions to complete the transfer:		
	Handle operating speed 1 m/s ± 25%		N/A
	Contact transfer time (ms).....:		N/A
	ATSE or RTSE:		
	100% control circuit supply voltage.....:		P
	Contact transfer time (ms).....:	786ms	P
9.2.3.3.	**Controls, sequence and limits of operation**		
9.2.3.3.2	Operation on loss of supply voltage		
	ATSE provided with adjustable time delay(s): Tested with minimum and maximum values.	0s-90s	P
	With one of the monitored phases of source I disconnected, for a duration shorter than the corresponding time-delay, the ATSE shall not transfer.		P
	With one of the monitored phases of source I disconnected, for a duration longer than the corresponding time-delay if applicable, the ATSE shall transfer to position II. Transfer time shall be within the limits specified by the manufacturer.		P
	With the source I phase reconnected, the ATSE shall either return to position I, if set to “automatic return” mode, or stay in position II if set to “non-automatic return” mode.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Tested for each monitored source supply with each of the monitored source conductors disconnected in turn.	see appended table 9.2.3.3.2	P
9.2.3.3.3	Operation on deviation of source I supply characteristics		
	ATSE provided with adjustable time delay(s): Tested with minimum value.	0s	P
	ATSE provided with adjustable deviation limits: Tested with minimum and maximum values.	Undervoltage: 187V Overvoltage: 263V	P
	Declared supply characteristic monitored on each terminal of source I shall be altered in turn to the values and tolerances as stated by the manufacturer and then restored to the original value:		
	- for voltage limits	see appended table 9.2.3.3.3	P
	- for frequency limits	see appended table 9.2.3.3.3	P
	- by altering the supply characteristic on all the phases simultaneously and by restoring it to its original value	see appended table 9.2.3.3.3	P
	During each of the tests, the ATSE:		
	- shall not transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value within the deviation limits		P
	- shall transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value outside of the deviation limits		P
	- shall either return to position I when the supply characteristic is restored, if set to “automatic return” mode, or stay in position II if set to “non-automatic return” mode		P
9.2.3.3.4	Operation on deviation of source II supply characteristics		
a)	For voltage supply deviation monitoring:		
	Transfer from position I to position II occurs within the source II voltage limits stated by the manufacturer:		
	- by increasing source II voltage starting from below the value stated by the manufacturer	see appended table 9.2.3.3.4	P
	- if overvoltage monitoring provided, by decreasing source II voltage starting from above the value stated by the manufacturer	see appended table 9.2.3.3.4	P
b)	For voltage and frequency deviation monitoring:		
1)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
2)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	P

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Clause	Requirement + Test	Result - Remark	Verdict
3)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
4)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	P
9.2.3.3.5	Operation with in-phase transfer control function		
	If the ATSE is provided with deviation limits for in-phase voltage, frequency and phase angle, the test shall be made once with the limit set to the minimum value, and once with the limit set to the maximum value for adjustable units.		N/A
	When deviation limits are fixed, same tests shall be done within the specified limits.		N/A
	Transfer from one position to another occurs within the limits stated by the manufacturer.	see appended table 9.2.3.3.5	N/A
9.2.3.4	**Tripping limits and characteristics**		
	The tripping limits and characteristics of CB type TSE shall be verified according to 8.3.3.2 of IEC 60947-2:2016, IEC 60947-2:2016/AMD1:2019.	See Attachment XX	N/A
9.2.3.5	**Temperature-rise**		
	ambient temperature 10-40 °C ..... :	23, 0°C	
	test enclosure W x H x D (mm x mm x mm) ..... :		
	material of enclosure ..... :		
	control circuit supply voltage (V) ..... :	110%Us	
	Main circuits, test conditions:		
	- rated operational current Ie (A) ..... :	3200A	
	- conventional thermal current Ith (A) ..... :	3200A	
	- conventional enclosed thermal current Ithe (A) ..... :		
	- cable / busbar cross-section (mm^2) / length (mm) .. :	4×(100×10)	
	Tested position:	position I	
	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) ..... :		
	Measured temperature-rise ..... :	see appended table 9.2.3.5	P
	Auxiliary circuits, test conditions:		
	- rated operation current (A) ..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	- cable cross-section (mm^2).....:		
	Measured temperature-rise.....:	see appended table 9.2.3.5	N/A
9.2.3.6	**Dielectric properties**		
	Verification of impulse withstand voltage		
	Rated impulse withstand voltage (kV).....:	12kV(main circuit); 2,5kV(control and auxiliary circuit)	
	- test Uimp main circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp auxiliary circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp control circuits (kV).....:	see appended table 9.2.3.6 a)	P
	- test Uimp on open main contacts (equipment suitable for isolation) (kV).....:	see appended table 9.2.3.6 a)	P
	Power-frequency or DC withstand verification		
	- rated insulation voltage Ui (V) .....:	1000V(main circuit); 250V(control and auxiliary circuit)	P
	- main circuits, test voltage for 1 min. (V) .....:	see appended table 9.2.3.6 b)	P
	- auxiliary circuits, test voltage for 1 min (V).....:	see appended table 9.2.3.6 b)	P
	- control circuits, test voltage for 1 min (V) .....:	see appended table 9.2.3.6 b)	P
	Devices, which have been disconnected for the power-frequency withstand voltage test.....:		P
	Equipment suitable for isolation, leakage current not exceed 0, 5 mA		
	Test voltage 1, 1 Ue (V).....:	440V	P
	Measured leakage current (mA).....:	<0,1mA	P

9.2.3	**TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS I-3, HDQ1S-320042500PU**		
9.2.3.1	**Compliance with constructional requirements**		
9.2.5 part 1	Mechanical and electrical properties of terminals		
9.2.5.2	Tests of mechanical strength of terminals		
	Maximum cross-section of conductor (mm^2).....:	4×(100×5)	
	Diameter of thread (mm).....:	M12	
	Torque (Nm).....:	15, 4Nm	
	5 times on 2 separate clamping units		P
	During the test, clamping units and terminals shall not work loose and there shall be no damage.		P
9.2.5.3 9.2.5.4	Testing for damage to and accidental loosening of conductor (flexion test) Pull-out test		

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Clause	Requirement + Test	Result - Remark	Verdict
a)	Conductor of the minimum cross-section (mm²) ..... :		
	Number of conductors of the minimum 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		
	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
b)	Conductor of the maximum cross-section (mm²) ..... :		
	Number of conductors of the maximum 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		
	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
c)	Conductor of the minimum and maximum cross-section (mm²) ..... :		
	Number of conductors of the minimum cross-section, number of conductors of the maximum 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		
	Force (N), applied for 1 min..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit.		N/A
9.2.5.7	Electrical performance of screwless-type clamping units		
	Subclauses 9.8 of IEC 60999-1:1999 and 9.8 of IEC 60999-2:2003 apply.	See Attachment XX	N/A
9.2.5.8	Ageing test for screwless-type clamping units		
	Subclauses 9.10 of IEC 60999-1:1999 and 9.10 of IEC 60999-2:2003 apply	See Attachment XX	N/A
9.2.8 part 1	Conduit pull-out test, torque test and bending test with metallic conduits		
9.2.8.2	Pull-out test		
	Torque (Nm)..... :		
	Force (N), applied for 5 min..... :		
	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/A
9.2.8.3	Bending test		
	Bending moment (Nm), applied for 1min..... :		
	After the test there shall be no evidence of damage impairing further use of the enclosure.		N/A
9.2.8.4	Torque test		
	Torque (Nm)..... :		N/A
	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/A
9.2.9 part 1	Test of earth continuity for protective earth		
9.2.9.2	Earth continuity test	see appended table 8.1.10.4	P
9.2.3.2	**Operation**		
9.2.3.2.1	General		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.	See Attachment XX	N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.3.2.2	Interlocking function verification		
9.2.3.2.2.2	Manual operation		
	The test performed without any electrical power available.		P
	For TSE equipped with a single manual actuator:		
	When the actuator is moved from position I to position II, it shall be verified that the terminals of source I are disconnected from the load terminals before the source II terminals are connected to the load terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	With source I switching device in closed position, it shall be verified that source II switching device cannot be manually switched to closed position;		N/A
b)	With source II switching device in closed position, it shall be verified that source I switching device cannot be manually switched to closed position;		N/A
c)	With source I and source II switching devices both in open position, it shall be verified that simultaneous closing operations do not result in the closure of both switching devices at any time.		N/A
9.2.3.2.2.3	Electrically controlled operation		
	Following tests made with control circuit supply voltage 85 % and 110 % of rated value.		N/A
	If the interlock of the TSE requires electrical power, the test shall be conducted with this power supply connected and disconnected.		N/A
	For TSE equipped of a single remote actuator:		
	When a remote order to transfer from position I to position II is applied, it shall be verified that the load terminals are disconnected from source I terminals before being connected to source II terminals. The test shall be repeated from position II to position I.		N/A
	For TSE equipped of distinct remote actuators for each switching device. Following sequence shall be verified:		

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Clause	Requirement + Test	Result - Remark	Verdict
a)	With source I and source II switching devices in the open position, it shall be verified that giving the order to switch both switching devices to close simultaneously for 5 s does not result in the closure of both devices. This test is applicable only to RTSE and ATSE allowing to send simultaneous transfer orders to position I and position II.		N/A
b)	With source I switching device in closed position, it shall be verified that sending a remote closing order on source II switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
c)	With source II switching device in closed position, it shall be verified that sending a remote closing order on source I switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
9.2.3.2.3	Verification of the robustness of the interlock		
9.2.3.2.3.1	General		
	The test shall be conducted in both position I and position II of the TSE.		P
	If the construction of the TSE is such that there is no significant physical difference between position I and position II that would influence the test results, the tests can be done in either position I or II.		P
	If it can be determined that one position represents a more difficult case, the tests are only required to be done in that position.		N/A
	MTSE shall be tested using manual operation means.		N/A
	RTSE and ATSE shall be tested using remote operation means, and manual operation means if applicable.		N/A
9.2.3.2.3.2	Manual operation		
	The test performed without any electrical power available.		P
	- actuator type (fig.).....:		
	- actuating force from one position to another (N)....:	154N	
	- test force with blocked main contacts (N).....:	462N	
	- used method to keep the contact closed.....:	Welding	
	For TSE equipped with a single manual actuator:		
	Test force applied 10s in the direction to open the contacts previously fixed together and close the other source switching device.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	Test force applied 10s in the direction to open the contacts previously fixed together.		N/A
b)	Other source switching device cannot be manually switched to the closed position.		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.3	Dependent power operation		
	RTSE and ATSE with dependent power operation the TSE shall be closed in position I.		N/A
	- used method to keep the contact closed.....:		
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A
	- 110% supply voltage to the power operator applied .....:		N/A
	- three attempts to operate at 5min intervals .....:		N/A
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		N/A
9.2.3.2.3.4	Independent power operation		
	RTSE and ATSE with independent power operation the TSE shall be closed in position I.		P
	- used method to keep the contact closed.....:	Welding	
	If the interlock of the TSE requires electrical power, this power supply shall be disconnected.		N/A
	- stored energy of the power operator released (3 times).....:		P
	During and after the test, none of the main contacts of the other source switching device shall close whether temporarily or definitely.		P
9.2.3.2.4	Verification of electrical interlock in case of individual failure		
	Applies when the equipment is equipped with only electrical interlock, or with only electrically driven mechanical interlock, and no mechanical interlock.		N/A
	Verification of 8.2.1.2 c) shall be performed using:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- FMEA according to IEC 60812 or		N/A
	- by simulating any possible individual failure ..... :		N/A
9.2.3.2.5	Verification of the contact transfer time		
	TSE having a single mechanical operating handle:		
	Handle operating speed 1 m/s ± 25%	1,10m/s	P
	Contact transfer time (ms)..... :	695ms	P
	TSE having mechanical operating means requiring multiple motions to complete the transfer:		
	Handle operating speed 1 m/s ± 25%		N/A
	Contact transfer time (ms)..... :		N/A
	ATSE or RTSE:		
	100% control circuit supply voltage..... :		P
	Contact transfer time (ms)..... :	684ms	P
9.2.3.3.	**Controls, sequence and limits of operation**		
9.2.3.3.2	Operation on loss of supply voltage		
	ATSE provided with adjustable time delay(s): Tested with minimum and maximum values.		N/A
	With one of the monitored phases of source I disconnected, for a duration shorter than the corresponding time-delay, the ATSE shall not transfer.		P
	With one of the monitored phases of source I disconnected, for a duration longer than the corresponding time-delay if applicable, the ATSE shall transfer to position II. Transfer time shall be within the limits specified by the manufacturer.		P
	With the source I phase reconnected, the ATSE shall either return to position I, if set to "automatic return" mode, or stay in position II if set to "non-automatic return" mode.		P
	Tested for each monitored source supply with each of the monitored source conductors disconnected in turn.	see appended table 9.2.3.3.2	P
9.2.3.3.3	Operation on deviation of source I supply characteristics		
	ATSE provided with adjustable time delay(s): Tested with minimum value.		N/A
	ATSE provided with adjustable deviation limits: Tested with minimum and maximum values.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Declared supply characteristic monitored on each terminal of source I shall be altered in turn to the values and tolerances as stated by the manufacturer and then restored to the original value:		
	- for voltage limits	see appended table 9.2.3.3.3	N/A
	- for frequency limits	see appended table 9.2.3.3.3	N/A
	- by altering the supply characteristic on all the phases simultaneously and by restoring it to its original value	see appended table 9.2.3.3.3	N/A
	During each of the tests, the ATSE:		
	- shall not transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value within the deviation limits		N/A
	- shall transfer to position II when the supply characteristic is reduced or increased, if applicable, to a value outside of the deviation limits		N/A
	- shall either return to position I when the supply characteristic is restored, if set to “automatic return” mode, or stay in position II if set to “non-automatic return” mode		N/A
9.2.3.3.4	Operation on deviation of source II supply characteristics		
a)	For voltage supply deviation monitoring:		
	Transfer from position I to position II occurs within the source II voltage limits stated by the manufacturer:		
	- by increasing source II voltage starting from below the value stated by the manufacturer	see appended table 9.2.3.3.4	N/A
	- if overvoltage monitoring provided, by decreasing source II voltage starting from above the value stated by the manufacturer	see appended table 9.2.3.3.4	N/A
b)	For voltage and frequency deviation monitoring:		
1)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	N/A
2)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	N/A
3)	Transfer from position I to position II occurs within the frequency limits stated by the manufacturer.	see appended table 9.2.3.3.4	N/A
4)	Transfer from position I to position II occurs within the voltage limits stated by the manufacturer.	see appended table 9.2.3.3.4	N/A
9.2.3.3.5	Operation with in-phase transfer control function		

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Clause	Requirement + Test	Result - Remark	Verdict
	If the ATSE is provided with deviation limits for in-phase voltage, frequency and phase angle, the test shall be made once with the limit set to the minimum value, and once with the limit set to the maximum value for adjustable units.		N/A
	When deviation limits are fixed, same tests shall be done within the specified limits.		N/A
	Transfer from one position to another occurs within the limits stated by the manufacturer.	see appended table 9.2.3.3.5	N/A
9.2.3.4	**Tripping limits and characteristics**		
	The tripping limits and characteristics of CB type TSE shall be verified according to 8.3.3.2 of IEC 60947-2:2016, IEC 60947-2:2016/AMD1:2019.	See Attachment XX	N/A
9.2.3.5	**Temperature-rise**		
	ambient temperature 10-40 °C ..... :	22,7°C	
	test enclosure W x H x D (mm x mm x mm) ..... :		
	material of enclosure ..... :		
	control circuit supply voltage (V) ..... :	110%Us	
	Main circuits, test conditions:		
	- rated operational current Ie (A) ..... :	2500A	
	- conventional thermal current Ith (A) ..... :	2500A	
	- conventional enclosed thermal current Ithe (A) ..... :		
	- cable / busbar cross-section (mm^2) / length (mm) .. :	4×(100×5)	
	Tested position:	position I	
	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) ..... :		
	Measured temperature-rise ..... :	see appended table 9.2.3.5	N/A
	Auxiliary circuits, test conditions:		
	- rated operation current (A) ..... :		
	- cable cross-section (mm^2) ..... :		
	Measured temperature-rise ..... :	see appended table 9.2.3.5	N/A
9.2.3.6	**Dielectric properties**		
	Verification of impulse withstand voltage		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated impulse withstand voltage (kV)..... :	12kV(main circuit); 2,5kV(control and auxiliary circuit)	
	- test Uimp main circuits (kV)..... :	see appended table 9.2.3.6 a)	P
	- test Uimp auxiliary circuits (kV)..... :	see appended table 9.2.3.6 a)	P
	- test Uimp control circuits (kV)..... :	see appended table 9.2.3.6 a)	P
	- test Uimp on open main contacts (equipment suitable for isolation) (kV)..... :	see appended table 9.2.3.6 a)	P
	Power-frequency or DC withstand verification		
	- rated insulation voltage Ui (V) ..... :	1000V(main circuit); 250V(control and auxiliary circuit)	P
	- main circuits, test voltage for 1 min. (V) ..... :	see appended table 9.2.3.6 b)	P
	- auxiliary circuits, test voltage for 1 min (V) ..... :	see appended table 9.2.3.6 b)	P
	- control circuits, test voltage for 1 min (V) ..... :	see appended table 9.2.3.6 b)	P
	Devices, which have been disconnected for the power-frequency withstand voltage test..... :		P
	Equipment suitable for isolation, leakage current not exceed 0, 5 mA		
	Test voltage 1, 1 Ue (V)..... :	440V	P
	Measured leakage current (mA)..... :	<0,1mA	P

9.2.4	**TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY II-1, HDQ1S-320042000DU**		
9.2.4.1	**Making and breaking capacities**		
	- utilization category..... :	AC-32B	
	- rated operational voltage Ue (V)..... :	400V	
	- rated operational current Ie (A)..... :	2000A	
	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)..... :		
	Test conditions, make/break operations:		
	- test voltage, U = 1, 05 x Ue (V) ..... :	429V	

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current, I = ...~~10~~ 3 x Ie (A):	6000A(tested at 12200A)	
	- power factor / ~~time constant~~ .....:	0,48	
	- transient recovery voltage (V).....:	429	P
	- current duration (ms) .....:	4,51s	P
	- time interval between operations (s).....:	5min	P
	Number of make/break operations .....:	5	P
	Number of make/break operations for RTSE and ATSE using the manual operating means.....:	1	P
	Characteristic of transient recovery voltage		
	- oscillatory frequency (kHz).....:	108,4	
	- measured oscillatory frequency (kHz).....:	108,8	P
	- factor γ .....:	1,12	P
	Behaviour of the equipment during the test:		
	No failure during the test		P
	No melting of the fuse in the detection circuit		P
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.4.2	**Operational performance capability**		
	- utilization category.....:	AC-32B	
	- rated operational voltage Ue (V).....:	400V	
	- rated operational current Ie (A).....:	2000A	
9.2.4.2.2	Electrical operational performance		
	- test voltage, U = 1, 05 x Ue (V) .....:	429V	
	- test current, I = 1 x Ie (A).....:	2050A	
	- power factor/time constant.....:	0, 78	
	Number of operating cycles with current.....:	500(100 cycles manual, 400 cycles automatic)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Duration of operating cycles.....:	6 min	P
	Behaviour of the equipment during the test:		
	No failure during the test		P
	No melting of the fuse in the detection circuit		P
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.4.2.3	Mechanical operational performance		
	Number of operating cycles with current.....:	1500	P
	Duration of operating cycles.....:	6 min	P
	Behaviour of the equipment after the test: TSE shall pass tests of 9.2.3.2.1 and 9.2.3.2.2		
9.2.3.2.1	Operation, general		P
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.3.2.2	Interlocking function verification		
9.2.3.2.2.2	Manual operation		
	The test performed without any electrical power available.		P
	For TSE equipped with a single manual actuator:		

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Clause	Requirement + Test	Result - Remark	Verdict
	When the actuator is moved from position I to position II, it shall be verified that the terminals of source I are disconnected from the load terminals before the source II terminals are connected to the load terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	With source I switching device in closed position, it shall be verified that source II switching device cannot be manually switched to closed position;		N/A
b)	With source II switching device in closed position, it shall be verified that source I switching device cannot be manually switched to closed position;		N/A
c)	With source I and source II switching devices both in open position, it shall be verified that simultaneous closing operations do not result in the closure of both switching devices at any time.		N/A
9.2.3.2.2.3	Electrically controlled operation		
	Following tests made with control circuit supply voltage 85 % and 110 % of rated value.		P
	If the interlock of the TSE requires electrical power, the test shall be conducted with this power supply connected and disconnected.		P
	For TSE equipped of a single remote actuator:		
	When a remote order to transfer from position I to position II is applied, it shall be verified that the load terminals are disconnected from source I terminals before being connected to source II terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped of distinct remote actuators for each switching device. Following sequence shall be verified:		
a)	With source I and source II switching devices in the open position, it shall be verified that giving the order to switch both switching devices to close simultaneously for 5 s does not result in the closure of both devices. This test is applicable only to RTSE and ATSE allowing to send simultaneous transfer orders to position I and position II.		N/A
b)	With source I switching device in closed position, it shall be verified that sending a remote closing order on source II switching device for 5 s does not result in the closure of both switching devices at any time.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
c)	With source II switching device in closed position, it shall be verified that sending a remote closing order on source I switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
	If the minimum contact transfer time is lower than 75 % of the initial value and is lower than 200 ms for alternating current or 1 000 ms for direct current, the TSE shall be subjected to a making and breaking capacity test according to 9.2.4.1, except that only three operations are required.		N/A
	Alternatively, at the discretion of the manufacturer, the making and breaking test of 9.2.4.1 may be made after the electrical and mechanical operational performance tests.		N/A
9.2.4.1	**Making and breaking capacities**		
	- utilization category.....:		
	- rated operational voltage Ue (V).....:		
	- rated operational current Ie (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).....:		
	Test conditions, make/break operations:		
	- test voltage, U = 1, 05 x Ue (V) .....:		
	- test current, I = ... x Ie (A):		
	- power factor/time constant .....:		
	- transient recovery voltage (V).....:		N/A
	- current duration (ms) .....:		N/A
	- time interval between operations (s).....:		N/A
	Number of make/break operations .....:		N/A
	Number of make/break operations for RTSE and ATSE using the manual operating means.....:		N/A
	Characteristic of transient recovery voltage		
	- oscillatory frequency (kHz).....:		
	- measured oscillatory frequency (kHz).....:		N/A
	- factor γ .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Behaviour of the equipment during the test:		
	No failure during the test		N/A
	No melting of the fuse in the detection circuit		N/A
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		N/A
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		N/A
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		N/A
9.2.4.3	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC) ..... :	1000V	P
	No breakdown or flashover		P
	Leakage current		
	test voltage (1, 1 x Ue) (V) ..... :	440V	P
	Leakage current ≤ 2 mA / pole ..... :	<0, 5mA	P
9.2.4.4	**Verification of temperature-rise**		
	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)..... :		
	- conductor cross-section (mm²)..... :	3×(100×5)	
	- test current Ie (A)..... :	2018A	
	Measured temperature-rise..... :	see appended table 9.2.4.4	P
9.2.4.5	**Verification of overload releases**		
	Applies Class CB TSE only		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 1.45 times the value of their current setting at the reference temperature: (A) ..... :		N/A
	Conventional tripping time (min / s):..... : <1h when In < 63A, <2h when In > 63 A		N/A
9.2.4.6	**Verification of the effectiveness of indication of the main contact position of equipment suitable for isolation**		
	Applies for Class PC TSE and Class CB TSE suitable for isolation	Class PC	P
9.2.6 part 1	- actuator type (fig.)..... :		
9.2.6.2.1	Dependent and independent manual operation		
	- actuating force for opening (N)..... :	156N	
	- test force with blocked main contacts (N)..... :	468N	
	- used method to keep the contact closed..... :	Welding	
	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
9.2.6.2.2	Dependent power operation		
	- main contacts fixed together in the closed position :		N/A
	- used method to keep the contact closed..... :		
	- 110% of the rated supply voltage applied to the equipment (3 times)..... :		N/A
	During and after the test, open position not indicated ..... :		N/A
	Equipment show no damage impairing its normal operation..... :		N/A
	Equipment with locking mean, no locking in the open position while test force is applied..... :		N/A
9.2.6.2.3	Independent power operation		
	- main contacts fixed together in the closed position :		P
	- used method to keep the contact closed..... :	Welding	
	- stored energy of the power operator released (3 times)..... :		P
	During and after the test, open position not indicated ..... :		P
	Equipment show no damage impairing its normal operation..... :		P
	Equipment with locking mean, no locking in the open position while test force is applied..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.4	**TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY** **II-2, HDQ1S-320043200DD**		
9.2.4.1	**Making and breaking capacities**		
	- utilization category.....:	AC-33B	
	- rated operational voltage Ue (V).....:	400V	
	- rated operational current Ie (A).....:	1600A	
	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).....:		
	Test conditions, make/break operations:		
	- test voltage, U = 1, 05 x Ue (V) .....:	429V	
	- test current, I = ...10 x Ie (A):	16000A(tested at 19400A)	
	- power factor / ~~time constant~~ .....:	0, 48	
	- transient recovery voltage (V).....:	429	P
	- current duration (ms) .....:	4, 45	P
	- time interval between operations (s).....:	5min	P
	Number of make/break operations .....:	5	P
	Number of make/break operations for RTSE and ATSE using the manual operating means.....:	3	P
	Characteristic of transient recovery voltage		
	- oscillatory frequency (kHz).....:	119, 1	
	- measured oscillatory frequency (kHz).....:	119, 4	P
	- factor γ .....:	1,12	P
	Behaviour of the equipment during the test:		
	No failure during the test		P
	No melting of the fuse in the detection circuit		P
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.4.2	**Operational performance capability**		
	- utilization category.....:	AC-33B	
	- rated operational voltage Ue (V).....:	400V	
	- rated operational current Ie (A).....:	1600A	
9.2.4.2.2	Electrical operational performance		
	- test voltage, U = 1, 05 x Ue (V) .....:	429V	
	- test current, I = 1 x Ie (A).....:	1600A(tested at 3250A)	
	- power factor/time constant.....:	0, 78	
	Number of operating cycles with current.....:	500(100 cycles manual, 400 cycles automatic)	P
	Duration of operating cycles.....:	6 min	P
	Behaviour of the equipment during the test:		
	No failure during the test		P
	No melting of the fuse in the detection circuit		P
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.4.2.3	Mechanical operational performance		
	Number of operating cycles with current.....:	1500	P
	Duration of operating cycles.....:	6 min	P
	Behaviour of the equipment after the test: TSE shall pass tests of 9.2.3.2.1 and 9.2.3.2.2		

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.3.2.1	Operation, general		P
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		P
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		P
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		P
9.2.3.2.2	Interlocking function verification		
9.2.3.2.2.2	Manual operation		
	The test performed without any electrical power available.		P
	For TSE equipped with a single manual actuator:		
	When the actuator is moved from position I to position II, it shall be verified that the terminals of source I are disconnected from the load terminals before the source II terminals are connected to the load terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped with distinct manual actuators for each source switching device. Following sequence shall be verified:		
a)	With source I switching device in closed position, it shall be verified that source II switching device cannot be manually switched to closed position;		N/A
b)	With source II switching device in closed position, it shall be verified that source I switching device cannot be manually switched to closed position;		N/A
c)	With source I and source II switching devices both in open position, it shall be verified that simultaneous closing operations do not result in the closure of both switching devices at any time.		N/A
9.2.3.2.2.3	Electrically controlled operation		
	Following tests made with control circuit supply voltage 85 % and 110 % of rated value.		P
	If the interlock of the TSE requires electrical power, the test shall be conducted with this power supply connected and disconnected.		P
	For TSE equipped of a single remote actuator:		

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Clause	Requirement + Test	Result - Remark	Verdict
	When a remote order to transfer from position I to position II is applied, it shall be verified that the load terminals are disconnected from source I terminals before being connected to source II terminals. The test shall be repeated from position II to position I.		P
	For TSE equipped of distinct remote actuators for each switching device. Following sequence shall be verified:		
a)	With source I and source II switching devices in the open position, it shall be verified that giving the order to switch both switching devices to close simultaneously for 5 s does not result in the closure of both devices. This test is applicable only to RTSE and ATSE allowing to send simultaneous transfer orders to position I and position II.		N/A
b)	With source I switching device in closed position, it shall be verified that sending a remote closing order on source II switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
c)	With source II switching device in closed position, it shall be verified that sending a remote closing order on source I switching device for 5 s does not result in the closure of both switching devices at any time.		N/A
	If the minimum contact transfer time is lower than 75 % of the initial value and is lower than 200 ms for alternating current or 1 000 ms for direct current, the TSE shall be subjected to a making and breaking capacity test according to 9.2.4.1, except that only three operations are required.		N/A
	Alternatively, at the discretion of the manufacturer, the making and breaking test of 9.2.4.1 may be made after the electrical and mechanical operational performance tests.		N/A
9.2.4.1	**Making and breaking capacities**		
	- utilization category..... :		
	- rated operational voltage Ue (V)..... :		
	- rated operational current Ie (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)..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	Test conditions, make/break operations:		
	- test voltage, U = 1, 05 x Ue (V) .....:		
	- test current, I = ... x Ie (A):		
	- power factor/time constant.....:		
	- transient recovery voltage (V).....:		N/A
	- current duration (ms) .....:		N/A
	- time interval between operations (s).....:		N/A
	Number of make/break operations .....:		N/A
	Number of make/break operations for RTSE and ATSE using the manual operating means.....:		N/A
	Characteristic of transient recovery voltage		
	- oscillatory frequency (kHz).....:		
	- measured oscillatory frequency (kHz).....:		N/A
	- factor γ.....:		N/A
	Behaviour of the equipment during the test:		
	No failure during the test		N/A
	No melting of the fuse in the detection circuit		N/A
	Behaviour of the equipment after the test:		
	The operating mechanism shall be mechanically and/or electrically interlocked to prevent simultaneous connection to both source I and source II supplies under all conditions at the limits given in subclause 8.2.1.2 of IEC 60947-1:2020.		N/A
	The TSE shall be operated in each position (I, II and O if applicable) and each position of the switching device contacts shall be verified by electrical continuity test.		N/A
	For Class CC TSE, the drop-out test requirements of 9.3.3.2.1 of IEC 60947-1:2020 shall be verified.		N/A
	Compliance to opening and closing of main contacts is checked by inspection and by manual test.		N/A
9.2.4.3	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC).....:	1000V	P
	No breakdown or flashover		P
	Leakage current		
	test voltage (1, 1 x Ue) (V) .....:	440V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Leakage current ≤ 2 mA / pole ..... :	<0, 5mA	P
9.2.4.4	**Verification of temperature-rise**		
	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)..... :		
	- conductor cross-section (mm²)..... :	4×(100×10)	
	- test current Ie (A)..... :	1600A(tested at 3218A)	
	Measured temperature-rise..... :	see appended table 9.2.4.4	P
9.2.4.5	**Verification of overload releases**		
	Applies Class CB TSE only		N/A
	Test current: 1.45 times the value of their current setting at the reference temperature: (A) ..... :		N/A
	Conventional tripping time (min / s):..... : <1h when In < 63A, <2h when In > 63 A		N/A
9.2.4.6	**Verification of the effectiveness of indication of the main contact position of equipment suitable for isolation**		
	Applies for Class PC TSE and Class CB TSE suitable for isolation	Class PC	P
9.2.6 part 1	- actuator type (fig.)..... :		
9.2.6.2.1	Dependent and independent manual operation		
	- actuating force for opening (N)..... :	158N	
	- test force with blocked main contacts (N)..... :	474N	
	- used method to keep the contact closed..... :	Contact weld	
	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
9.2.6.2.2	Dependent power operation		
	- main contacts fixed together in the closed position :		N/A
	- used method to keep the contact closed..... :		
	- 110% of the rated supply voltage applied to the equipment (3 times)..... :		N/A
	During and after the test, open position not indicated ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Equipment show no damage impairing its normal operation.....:		N/A
	Equipment with locking mean, no locking in the open position while test force is applied.....:		N/A
9.2.6.2.3	Independent power operation		
	- main contacts fixed together in the closed position :		P
	- used method to keep the contact closed.....:	Welding	
	- stored energy of the power operator released (3 times).....:		P
	During and after the test, open position not indicated .....:		P
	Equipment show no damage impairing its normal operation.....:		P
	Equipment with locking mean, no locking in the open position while test force is applied.....:		N/A
9.2.5	**TEST SEQUENCE III – SHORT-CIRCUIT PERFORMANCE CAPABILITY III-1, HDQ1S-320042000DU**		
9.2.5.2	**Short-time withstand current**		
	Rated short-time withstand current Icw (kA).....:	50kA/60ms	
	- test voltage (V).....:	429V	
	- r.m.s test current (kA) .....:	51, 7kA	
	- peak test current (kA) .....:	109kA	
	- power factor/time constant.....:	0, 23	
	- current duration (s) .....:	62, 6ms	
	Behaviour of the equipment during the test		P
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		P
	No melting of the fuse in the detection circuit		P
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		P
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.3	**Short-circuit making capacity**		

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated short-circuit making capacity Icm (kA) .....:	105kA	
	- test voltage (V).....:	429V	
	- r.m.s test current (kA) .....:	109kA	
	- maximum peak test current (kA).....:	109kA	
	- power factor/time constant.....:	0, 23ms	
	- current duration (s) .....:	61.2ms	
	Behaviour of the equipment during the test		P
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		P
	No melting of the fuse in the detection circuit		P
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		P
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.4	**Short-circuit breaking capacity**		
9.2.5.4.3	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time:(s).....:	L1: L2: L3: N:	N/A
9.2.5.4.4	Test of rated short-circuit breaking capacity		
	Rated short-circuit breaking capacity Icn (kA) .....:		
	Test sequence of operation: O – t – CO		
	- test voltage (V).....:		
	- r.m.s test current (kA) .....:		
	- power factor/time constant.....:		
	- Factor ”n”		
	- peak test current (kA max).....:		
	Test sequence ”O”		
	- max. let-through current (kA peak) .....:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- joule integral I²dt (A²s).....:		
	Pause, t: (min) .....:		
	Test sequence "CO"		
	- max. let-through current (kA peak) .....:		
	- joule integral I²dt (A²s).....:		
	Behaviour of the equipment during the test		N/A
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		N/A
	No melting of the fuse in the detection circuit		N/A
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		N/A
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.4.5	Verification of overload releases		
	The operation of overload releases shall be verified at 2, 5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time:(s).....:	L1: L2: L3: N:	N/A
9.2.5.5	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC).....:	1000V	P
	No breakdown or flashover		P
	Leakage current		
	test voltage (1, 1 x Ue) (V) .....:	440V	P
	Leakage current ≤ 2 mA / pole .....:	<0, 5mA	P
9.2.5.6	**Verification of temperature-rise**		
	Fuse-link details (fuse-combination units only):		
	- manufacturer's name, trademark or identification mark .....:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- manufacturer's model or type reference.....:		
	- rated current (A).....:		
	- power loss (W).....:		
	- rated breaking capacity (kA).....:		
	- conductor cross-section (mm²).....:	3× (100×5)	
	- test current Ie (A).....:	2008A	
	Measured temperature-rise.....:	see appended table 9.2.5.6	P
9.2.5	**TEST SEQUENCE III – SHORT-CIRCUIT PERFORMANCE CAPABILITY III-2, HDQ1S-320043200DD**		
9.2.5.2	**Short-time withstand current**		
	Rated short-time withstand current Icw (kA).....:	50kA/60ms	
	- test voltage (V).....:	429V	
	- r.m.s test current (kA).....:	51, 7kA	
	- peak test current (kA).....:	109kA	
	- power factor/time constant.....:	0, 23	
	- current duration (s).....:	61, 3ms	
	Behaviour of the equipment during the test		P
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		P
	No melting of the fuse in the detection circuit		P
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		P
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.3	**Short-circuit making capacity**		
	Rated short-circuit making capacity Icm (kA).....:	105kA	
	- test voltage (V).....:	429V	
	- r.m.s test current (kA).....:	109kA	
	- maximum peak test current (kA).....:	109kA	
	- power factor/time constant.....:	0, 23ms	
	- current duration (s).....:	63.1ms	
	Behaviour of the equipment during the test		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		P
	No melting of the fuse in the detection circuit		P
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		P
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.4	**Short-circuit breaking capacity**		
9.2.5.4.3	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time:(s)..... :	L1: L2: L3: N:	N/A
9.2.5.4.4	Test of rated short-circuit breaking capacity		
	Rated short-circuit breaking capacity Icn (kA) ..... :		
	Test sequence of operation: O – t – CO		
	- test voltage (V)..... :		
	- r.m.s test current (kA) ..... :		
	- power factor/time constant..... :		
	- Factor ”n”		
	- peak test current (kA max)..... :		
	Test sequence ”O”		
	- max. let-through current (kA peak) ..... :		
	- joule integral I^2dt (A^2s)..... :		
	Pause, t: (min) ..... :		
	Test sequence ”CO”		
	- max. let-through current (kA peak) ..... :		
	- joule integral I^2dt (A^2s)..... :		
	Behaviour of the equipment during the test		N/A
	Behaviour of the equipment after the test:		

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Clause	Requirement + Test	Result - Remark	Verdict
	TSE contacts shall close and open by their normal means. No contact welding.		N/A
	No melting of the fuse in the detection circuit		N/A
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		N/A
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.5.4.5	Verification of overload releases		
	The operation of overload releases shall be verified at 2, 5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:		N/A
	- Operation time:(s)..... :	L1: L2: L3: N:	N/A
9.2.5.5	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC)..... :	1000V	P
	No breakdown or flashover		P
	Leakage current		
	test voltage (1, 1 x Ue) (V) ..... :	440V	P
	Leakage current ≤ 2 mA / pole ..... :	<0, 5mA	P
9.2.5.6	**Verification of temperature-rise**		
	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)..... :		
	- conductor cross-section (mm²)..... :	4× (100×10)	
	- test current Ie (A)..... :	3217A	
	Measured temperature-rise..... :	see appended table 9.2.5.6	P

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.6	**TEST SEQUENCE IV – CONDITIONAL SHORT-CIRCUIT CURRENT**		
	Short-circuit protective device (SCPD) details:		
	- manufacturer's name, trademark or identification mark ..... :		
	- manufacturer's model or type reference..... :		
	- rated voltage (V)..... :		
	- rated current (A) ..... :		
	- rated breaking capacity (kA)..... :		
	SCPD protective short-circuit		
	- test voltage (V)..... :		
	- r.m.s test current (kA) ..... :		
	- power factor/~~time constant~~ ..... :		
	SCPD protective short-circuit withstand		
	- max. let-through current: (kA)..... :		
	- joule integral I²dt (A²s)..... :		
	SCPD protective short-circuit making		
	- max. let-through current: (kA)..... :		
	- joule integral I²dt (A²s)..... :		
	Behaviour of the equipment during the test		N/A
	Behaviour of the equipment after the test:		
	TSE contacts shall close and open by their normal means. No contact welding.		N/A
	No melting of the fuse in the detection circuit		N/A
	No breakage of the TSE to the extent that the integrity of the mounting of live parts is impaired		N/A
	Enclosed TSE: The door shall be prevented by its latching means, without additional locking means, from being blown open, but deformation of the door alone is not considered to constitute a failure, provided the requirements of degree of protection IP2X are met.		N/A
9.2.6.4	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC)..... :		N/A
	No breakdown or flashover		N/A
	Leakage current		

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Clause	Requirement + Test	Result - Remark	Verdict
	test voltage (1, 1 x Ue) (V) ..... :		N/A
	Leakage current ≤ 2 mA / pole ..... :		N/A
9.2.6.5	**Verification of temperature-rise**		
	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)..... :		
	- conductor cross-section (mm²)..... :		
	- test current Ie (A)..... :		
	Measured temperature-rise..... :		N/A

9.2.7	**TEST SEQUENCE V – CRITICAL LOAD CURRENT PERFORMANCE OF EQUIPMENT WITH A DC RATING**		
9.2.7.2	**Determination of critical load current**		
	Ue max (V)..... :		
	Direction of current flow as specified by manufacturer:		
	The equipment opened 7 times manually or mechanically at the manufacturer's discretion		N/A
	Direction of current flow is not specified by manufacturer:		
	4 operations in the forward direction and 3 in the reverse direction		N/A
	During each cycle, the equipment remain closed for a time sufficient to ensure that the full current is established, but not exceeding 2 s (s)..... :		N/A
	Time constant operational performance		N/A
	Number of operating cycles per hour..... :		N/A
	Arcing time during the test (≤1 s)..... :		N/A
	The test current values shall be: 4 A, 8 A, 16 A, 32 A and 63 A d.c., with ± 10 % tolerance, but not exceeding the rated current.		N/A
	Test currents to find critical d.c. load current and arcing times (ms)..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For each test current, the average arcing time is calculated.		N/A
	If two current flow directions are permitted, the maximum of the two values for this test current is used for further evaluation.		N/A
	If an average arcing time exceeds 1, 3 time the value of the average at the rated operational current at the highest rated operational voltage, this is considered a critical current.		N/A
	If no critical value of current is found within these criteria, no further test according to this subclause is required.		N/A
	Forward direction		N/A
	Critical value		N/A
	Maximum mean arcing time		N/A
	Reversed direction		N/A
	Critical value		N/A
	Maximum mean arcing time		N/A
9.2.7.3	**Critical load current performance**		
	- utilization category.....:		N/A
	- test voltage U/Ue = 1, 0 (V).....:		N/A
	- critical test current (A).....:		N/A
	- time constant.....:		N/A
	- number of operating cycles per hour .....:		N/A
	- number of operating cycles at I_{crit}.....:		N/A
	- on-time (ms) .....:		N/A
	- off-time (s) .....:		N/A
9.2.4.3	**Verification of dielectric withstand**		
	Dielectric verification		
	test voltage (2 x Ue) for 1min (V) (min.1000V AC / 1415V DC).....:		N/A
	No breakdown or flashover		N/A
	Leakage current		
	test voltage (1, 1 x Ue) (V) .....:		N/A
	Leakage current ≤ 2 mA / pole .....:		N/A
9.2.4.6	**Verification of the effectiveness of indication of the main contact position of equipment suitable for isolation**		
	Applies for Class PC TSE and Class CB TSE suitable for isolation		N/A

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.2.6 part 1	- actuator type (fig.)..... :		
9.2.6.2.1	Dependent and independent manual operation		
	- actuating force for opening (N)..... :		
	- test force with blocked main contacts (N)..... :		
	- used method to keep the contact closed..... :		
	During and after the test, open position not indicated ..... :		N/A
	Equipment with locking mean, no locking in the open position while test force is applied..... :		N/A
9.2.6.2.2	Dependent power operation		
	- main contacts fixed together in the closed position :		N/A
	- used method to keep the contact closed..... :		
	- 110% of the rated supply voltage applied to the equipment (3 times)..... :		N/A
	During and after the test, open position not indicated ..... :		N/A
	Equipment show no damage impairing its normal operation..... :		N/A
	Equipment with locking mean, no locking in the open position while test force is applied..... :		N/A
9.2.6.2.3	Independent power operation		
	- main contacts fixed together in the closed position :		N/A
	- used method to keep the contact closed..... :		
	- stored energy of the power operator released (3 times)..... :		N/A
	During and after the test, open position not indicated ..... :		N/A
	Equipment show no damage impairing its normal operation..... :		N/A
	Equipment with locking mean, no locking in the open position while test force is applied..... :		N/A
9.2.4.4	**Verification of temperature-rise**		
	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)..... :		

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Clause	Requirement + Test	Result - Remark	Verdict
	- conductor cross-section (mm²).....:		
	- test current Ie (A).....:		
	Measured temperature-rise.....:	see appended table 9.2.7.3	N/A

9.2.8	**TEST SEQUENCE VI – EMC TESTS** **VI-1, HDQ1S-320042000DU**		P
9.2.8.1	**General**		
	Product is classified to be used in environment.....:	B	-
9.2.8.2	**Immunity**		
9.2.8.2.2	Electrostatic discharges		
	Electrostatic discharge immunity test IEC 61000-4-2	air discharge / 8 kV contact discharge / 4 kV	P
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.3	Conducted and radiated disturbances induced by radio-frequency fields		
	Conducted disturbances induced by radio-frequency immunity test (150 kHz to 80 MHz) IEC 61000-4-6	10 V for AC/~~DC~~ power ports 10 V for signal ports	P
	The equipment complies with performance criterion A given in Table 7		P
	Radiated radio-frequency electromagnetic field immunity test (80 MHz to 1 GHz) IEC 61000-4-3	10 V/m	P
	The equipment complies with performance criterion A given in Table 7		P
	Radiated radio-frequency electromagnetic field immunity test (1, 4 GHz to 6 GHz) IEC 61000-4-3	3 V/m	P
	The equipment complies with performance criterion A given in Table 7		P
9.2.8.2.4	Fast transient bursts		
	Electrical fast transient/burst immunity test IEC 61000-4-4	2 kV / 5 kHz or 100 kHz on AC/~~DC~~ power ports ~~1 kV / 5 kHz or 100 kHz on signal ports~~	P
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.5	Surges		

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Surge immunity test (Impulse test 1, 2/50 µs – 8/20 µs) IEC 61000-4-5	2 kV (line-to-earth) 1 kV (line-to-line)	P
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.6	Power frequency magnetic fields		
	Power frequency magnetic field immunity test IEC 61000-4-8	30 A/m	N/A
	The equipment complies with performance criterion A given in Table 7		N/A
9.2.8.2.7	Harmonics		
	Harmonic voltage immunity test IEC 61000-4-13	class 3	P
	The equipment complies with performance criterion A given in Table 7	power and control circuits	P
	The equipment complies with performance criterion B given in Table 7	other functions	P
9.2.8.2.8	Voltage dips and short-time interruptions		
	Voltage dips immunity test (50 Hz/60 Hz) IEC 61000-4-11 for rated operational current ≤ 16 A		P
	Voltage dips immunity test (50 Hz/60 Hz) IEC 61000-4-34 for rated operational current > 16 A		P
	Voltage dips immunity test (50 Hz/60 Hz)	0 % during 1 cycle	P
	The equipment complies with performance criterion B given in Table 7		P
	Voltage dips immunity test (50 Hz/60 Hz)	40 % during 10/12 cycles 70 % during 25/30 cycles	P
	The equipment complies with performance criterion C given in Table 7		P
	Short interruptions immunity test (50 Hz/60 Hz) IEC 61000-4-11 for rated operational current ≤ 16 A		P
	Short interruptions immunity test (50 Hz/60 Hz) IEC 61000-4-34 for rated operational current > 16 A		P
	Short interruptions immunity test (50 Hz/60 Hz)	0 % during 250/300 cycles at 0°	P
	The equipment complies with performance criterion C given in Table 7		P
9.2.8.2.9	Performance of the test sample during and after the test		
	After the test, the operating limits of 9.2.3.3 shall be verified.		P

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.2.8.3	**Emission**		
9.2.8.3.2	Conducted radio-frequency emission tests		
	The equipment does not exceed the levels given in CISPR 11 for equipment Class B, group 1, or for equipment Class A, group 1, as appropriate.		P
9.2.8.3.3	Radiated radio-frequency emission tests		
	The equipment does not exceed the levels given in CISPR 11 for equipment Class B, group 1, or for equipment Class A, group 1, as appropriate.		P

9.2.8	**TEST SEQUENCE VI – EMC TESTS** **VI-2, HDQ1S-320043200GU**		P
9.2.8.1	**General**		
	Product is classified to be used in environment.....:	B	-
9.2.8.2	**Immunity**		
9.2.8.2.2	Electrostatic discharges		
	Electrostatic discharge immunity test IEC 61000-4-2	air discharge / 8 kV contact discharge / 4 kV	P
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.3	Conducted and radiated disturbances induced by radio-frequency fields		
	Conducted disturbances induced by radio-frequency immunity test (150 kHz to 80 MHz) IEC 61000-4-6	10 V for AC/~~DC~~ power ports 10 V for signal ports	P
	The equipment complies with performance criterion A given in Table 7		P
	Radiated radio-frequency electromagnetic field immunity test (80 MHz to 1 GHz) IEC 61000-4-3	10 V/m	P
	The equipment complies with performance criterion A given in Table 7		P
	Radiated radio-frequency electromagnetic field immunity test (1, 4 GHz to 6 GHz) IEC 61000-4-3	3 V/m	P
	The equipment complies with performance criterion A given in Table 7		P
9.2.8.2.4	Fast transient bursts		
	Electrical fast transient/burst immunity test IEC 61000-4-4	2 kV / 5 kHz or 100 kHz on AC/~~DC~~ power ports ~~1 kV / 5 kHz or 100 kHz on signal ports~~	P

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.5	Surges		
	Surge immunity test (Impulse test 1, 2/50 µs – 8/20 µs) IEC 61000-4-5	2 kV (line-to-earth) 1 kV (line-to-line)	P
	The equipment complies with performance criterion B given in Table 7		P
9.2.8.2.6	Power frequency magnetic fields		
	Power frequency magnetic field immunity test IEC 61000-4-8	30 A/m	N/A
	The equipment complies with performance criterion A given in Table 7		N/A
9.2.8.2.7	Harmonics		
	Harmonic voltage immunity test IEC 61000-4-13	class 3	P
	The equipment complies with performance criterion A given in Table 7	power and control circuits	P
	The equipment complies with performance criterion B given in Table 7	other functions	P
9.2.8.2.8	Voltage dips and short-time interruptions		
	Voltage dips immunity test (50 Hz/60 Hz) IEC 61000-4-11 for rated operational current ≤ 16 A		P
	Voltage dips immunity test (50 Hz/60 Hz) IEC 61000-4-34 for rated operational current > 16 A		P
	Voltage dips immunity test (50 Hz/60 Hz)	0 % during 1 cycle	P
	The equipment complies with performance criterion B given in Table 7		P
	Voltage dips immunity test (50 Hz/60 Hz)	40 % during 10/12 cycles 70 % during 25/30 cycles	P
	The equipment complies with performance criterion C given in Table 7		P
	Short interruptions immunity test (50 Hz/60 Hz) IEC 61000-4-11 for rated operational current ≤ 16 A		P
	Short interruptions immunity test (50 Hz/60 Hz) IEC 61000-4-34 for rated operational current > 16 A		P
	Short interruptions immunity test (50 Hz/60 Hz)	0 % during 250/300 cycles at 0°	P
	The equipment complies with performance criterion C given in Table 7		P

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.2.8.2.9	Performance of the test sample during and after the test		
	After the test, the operating limits of 9.2.3.3 shall be verified.		P
9.2.8.3	**Emission**		
9.2.8.3.2	Conducted radio-frequency emission tests		
	The equipment does not exceed the levels given in CISPR 11 for equipment Class B, group 1, or for equipment Class A, group 1, as appropriate.		P
9.2.8.3.3	Radiated radio-frequency emission tests		
	The equipment does not exceed the levels given in CISPR 11 for equipment Class B, group 1, or for equipment Class A, group 1, as appropriate.		P
9.4	**ENVIRONMENTAL TESTS**		
	Annex Q of IEC 60947-1:2020 applies.		N/A
	General test conditions and test results.	See Attachment XX	N/A

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

8.1.6	TABLE: Clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of:	**Uimp (kV)**	**Ui (V)**	**required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Pole and pole	12kV	1000V	14	39, 5	16	48, 6
Between live and exposed conductive parts	12kV	1000V	14	22, 4	16	38, 4
Supplementary information:						

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.2 TABLE: Operation on loss of supply voltage I-1

Ambient: (22, 8ºC)

	Test case									Operating times			
Test No	Rated voltage V	Control supply voltage V	Frequency Hz	Threshold %	Number of phases	N connection Yes/No	Tested phases L1/L2/L3	Time delay(s) min s	Time delay(s) max s	Step Disconnect/ Reconnect	CTT	OTT	Verdict
1	400	230	50	0	4	No	L1	0	90	Disconnet	757ms	4, 033s/94, 054s	P
2	400	230	50	0	4	No	L2	0	90	Disconnet	764ms	4, 026s/94, 028s	P
3	400	230	50	0	4	No	L3	0	90	Disconnet	766ms	4, 034s/94, 044s	P
4	400	230	50	0	4	No	L1	0	90	Reconnect	763ms	4, 031s/94, 034s	P
5	400	230	50	0	4	No	L2	0	90	Reconnect	759ms	4, 035s/94, 029s	P
6	400	230	50	0	4	No	L3	0	90	Reconnect	767ms	4, 042s/94, 040s	P
7	400	230	60	0	4	No	L1	0	90	Disconnet	768ms	4, 027s/94, 036s	P
8	400	230	60	0	4	No	L2	0	90	Disconnet	771ms	4, 032s/94, 034s	P
9	400	230	60	0	4	No	L3	0	90	Disconnet	762ms	4, 041s/94, 053s	P
10	400	230	60	0	4	No	L1	0	90	Reconnect	763ms	4, 025s/94, 047s	P
11	400	230	60	0	4	No	L2	0	90	Reconnect	759ms	4, 042s/94, 026s	P
12	400	230	60	0	4	No	L3	0	90	Reconnect	767ms	4, 037s/94, 035s	P

Supplementary information:

CTT: Contact Transfer Time (I - II/II – I, including adjustable OFF position time delay)

OTT: Operating transfer time (including all adjustable time delays; transfer, OFF-position and return)

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.2 TABLE: Operation on loss of supply voltage I-2

Ambient: (23, 0ºC)

	Test case									Operating times			
Test No	Rated voltage V	Control supply voltage V	Frequency Hz	Threshold %	Number of phases	N connection Yes/No	Tested phases L1/L2/L3	Time delay(s) min s	Time delay(s) max s	Step Disconnect/ Reconnect	CTT	OTT	Verdict
1	400	230	50	0	4	No	L1	0	90	Disconnet	765ms	2, 64s/92, 68s	P
2	400	230	50	0	4	No	L2	0	90	Disconnet	771ms	2, 88s/92, 74s	P
3	400	230	50	0	4	No	L3	0	90	Disconnet	768ms	2, 71s/92, 70s	P
4	400	230	50	0	4	No	L1	0	90	Reconnect	758ms	2, 64s/92, 72s	P
5	400	230	50	0	4	No	L2	0	90	Reconnect	766ms	2, 92s/92, 63s	P
6	400	230	50	0	4	No	L3	0	90	Reconnect	769ms	2, 77s/92, 84s	P
7	400	230	60	0	4	No	L1	0	90	Disconnet	786ms	2, 73s/92, 72s	P
8	400	230	60	0	4	No	L2	0	90	Disconnet	778ms	2, 69s/92, 88s	P
9	400	230	60	0	4	No	L3	0	90	Disconnet	782ms	2, 82s/92, 79s	P
10	400	230	60	0	4	No	L1	0	90	Reconnect	769ms	2, 82s/92, 65s	P
11	400	230	60	0	4	No	L2	0	90	Reconnect	780ms	2, 87s/92, 72s	P
12	400	230	60	0	4	No	L3	0	90	Reconnect	773ms	2, 93s/92, 76s	P

Supplementary information:

CTT: Contact Transfer Time (I - II/II – I, including adjustable OFF position time delay)

OTT: Operating transfer time (including all adjustable time delays; transfer, OFF-position and return)

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.2	**TABLE: Operation on loss of supply voltage I-3**												
	Ambient: (22, 7ºC)												
	Test case									Operating times			
Test No	Rated voltage V	Control supply voltage V	Frequency Hz	Threshold %	Number of phases	N connection Yes/No	Tested phases L1/L2/L3	Time delay(s) min s	Time delay(s) max s	Step Disconnect/ Reconnect	CTT	OTT	Verdict
1	400	230	50	0	4	No	L1	0	90	Disconnet	726ms	2, 15s	P
2	400	230	50	0	4	No	L2	0	90	Disconnet	730ms	2, 08s	P
3	400	230	50	0	4	No	L3	0	90	Disconnet	721ms	2, 02s	P
4	400	230	50	0	4	No	L1	0	90	Reconnect	724ms	2, 25s	P
5	400	230	50	0	4	No	L2	0	90	Reconnect	729ms	2, 16s	P
6	400	230	50	0	4	No	L3	0	90	Reconnect	718ms	2, 05s	P
7	400	230	60	0	4	No	L1	0	90	Disconnet	774ms	2, 29s	P
8	400	230	60	0	4	No	L2	0	90	Disconnet	750ms	2, 16s	P
9	400	230	60	0	4	No	L3	0	90	Disconnet	728ms	2, 21s	P
10	400	230	60	0	4	No	L1	0	90	Reconnect	752ms	2, 17s	P
11	400	230	60	0	4	No	L2	0	90	Reconnect	763ms	2, 23s	P
12	400	230	60	0	4	No	L3	0	90	Reconnect	774ms	2, 19s	P
Supplementary information:													
CTT: Contact Transfer Time (I - II/II – I, including adjustable OFF position time delay)													
OTT: Operating transfer time (including all adjustable time delays; transfer, OFF-position and return)													

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.3	**TABLE: Operation on deviation of source I supply characteristics / Voltage limits I-1**															
	Ambient: (22, 8ºC)															
	Specified accuracy (V): ±10%															
	Test case									Reference value			ATS measurement errors			
Test No	Rated phase voltage V	Frequency Hz	Threshold %	Time delay(s) min s	Number of phases	N connection Yes/No	Limit value V	Tested phases L1/L2/L3	Step Reduce/ restore	L1 V	L2 V	L3 V	L1 %	L2 %	L3 %	Verdict
1	230	50	-	0	4	No	187	L1	Reduce	201	N/A	N/A	N/A	N/A	N/A	P
2	230	50	-	0	4	No	187	L2	Reduce	N/A	174	N/A	N/A	N/A	N/A	P
3	230	50	-	0	4	No	187	L3	Reduce	N/A	N/A	182	N/A	N/A	N/A	P
4	230	50	-	0	4	No	187	L1, L2, L3	Reduce	193	193	193	N/A	N/A	N/A	P
5	230	50	-	0	4	No	263	L1	Increase	257	N/A	N/A	N/A	N/A	N/A	P
6	230	50	-	0	4	No	263	L2	Increase	N/A	282	N/A	N/A	N/A	N/A	P
7	230	50	-	0	4	No	263	L3	Increase	N/A	N/A	265	N/A	N/A	N/A	P
8	230	50	-	0	4	No	263	L1, L2, L3	Increase	263	263	263	N/A	N/A	N/A	P
9	230	60	-	0	4	No	187	L1	Reduce	194	N/A	N/A	N/A	N/A	N/A	P
10	230	60	-	0	4	No	187	L2	Reduce	N/A	186	N/A	N/A	N/A	N/A	P
11	230	60	-	0	4	No	187	L3	Reduce	N/A	N/A	191	N/A	N/A	N/A	P
12	230	60	-	0	4	No	187	L1, L2, L3	Reduce	187	187	187	N/A	N/A	N/A	P
13	230	60	-	0	4	No	263	L1	Increase	260	N/A	N/A	N/A	N/A	N/A	P
14	230	60	-	0	4	No	263	L2	Increase	N/A	262	N/A	N/A	N/A	N/A	P
15	230	60	-	0	4	No	263	L3	Increase	N/A	N/A	259	N/A	N/A	N/A	P
16	230	60	-	0	4	No	263	L1, L2, L3	Increase	263	263	263	N/A	N/A	N/A	P
Supplementary information:																

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.3	**TABLE: Operation on deviation of source I supply characteristics / Voltage limits I-2**															
	Ambient: (23, 0ºC)															
	Specified accuracy (V): ±10%															
	Test case									Reference value			ATS measurement errors			
Test No	Rated phase voltage V	Frequency Hz	Threshold %	Time delay(s) min s	Number of phases	N connection Yes/No	Limit value V	Tested phases L1/L2/L3	Step Reduce/ restore	L1 V	L2 V	L3 V	L1 %	L2 %	L3 %	Verdict
1	230	50	-	0	4	No	187	L1	Reduce	197	N/A	N/A	N/A	N/A	N/A	P
2	230	50	-	0	4	No	187	L2	Reduce	N/A	202	N/A	N/A	N/A	N/A	P
3	230	50	-	0	4	No	187	L3	Reduce	N/A	N/A	175	N/A	N/A	N/A	P
4	230	50	-	0	4	No	187	L1, L2, L3	Reduce	170	170	170	N/A	N/A	N/A	P
5	230	50	-	0	4	No	263	L1	Increase	281	N/A	N/A	N/A	N/A	N/A	P
6	230	50	-	0	4	No	263	L2	Increase	N/A	256	N/A	N/A	N/A	N/A	P
7	230	50	-	0	4	No	263	L3	Increase	N/A	N/A	247	N/A	N/A	N/A	P
8	230	50	-	0	4	No	263	L1, L2, L3	Increase	263	263	263	N/A	N/A	N/A	P
9	230	60	-	0	4	No	187	L1	Reduce	195	N/A	N/A	N/A	N/A	N/A	P
10	230	60	-	0	4	No	187	L2	Reduce	N/A	198	N/A	N/A	N/A	N/A	P
11	230	60	-	0	4	No	187	L3	Reduce	N/A	N/A	200	N/A	N/A	N/A	P
12	230	60	-	0	4	No	187	L1, L2, L3	Reduce	192	192	192	N/A	N/A	N/A	P
13	230	60	-	0	4	No	263	L1	Increase	259	N/A	N/A	N/A	N/A	N/A	P
14	230	60	-	0	4	No	263	L2	Increase	N/A	260	N/A	N/A	N/A	N/A	P
15	230	60	-	0	4	No	263	L3	Increase	N/A	N/A	256	N/A	N/A	N/A	P
16	230	60	-	0	4	No	263	L1, L2, L3	Increase	263	263	263	N/A	N/A	N/A	P
Supplementary information:																

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.3	TABLE: Operation on deviation of source I supply characteristics / Frequency limits I-1																
	Ambient:22, 8 (ºC)																
	Specified accuracy (f): ±1Hz																
	Test case									Reference value			ATS measurement errors				
Test No	Rated phase voltage V	Frequency Hz	Threshold %	Time delay(s) min s	Number of phases	N connection Yes/No	Limit value Hz	Tested phases L1/L2/L3	Step Reduce/ restore	f Hz			f %			Verdict	
1	230	50	-	0	4	No	45	L1	Reduce	45	N/A	N/A	N/A	N/A	N/A	P	
2	230	50	-	0	4	No	45	L2	Reduce	N/A	45	N/A	N/A	N/A	N/A	P	
3	230	50	-	0	4	No	45	L3	Reduce	N/A	N/A	45	N/A	N/A	N/A	P	
4	230	50	-	0	4	No	55	L1	increase	55	N/A	N/A	N/A	N/A	N/A	P	
5	230	50	-	0	4	No	55	L2	increase	N/A	55	N/A	N/A	N/A	N/A	P	
6	230	50	-	0	4	No	55	L3	increase	N/A	N/A	55	N/A	N/A	N/A	P	
7	230	60	-	0	4	No	50	L1	Reduce	50	N/A	N/A	N/A	N/A	N/A	P	
8	230	60	-	0	4	No	50	L2	Reduce	N/A	50	N/A	N/A	N/A	N/A	P	
9	230	60	-	0	4	No	50	L3	Reduce	N/A	N/A	50	N/A	N/A	N/A	P	
10	230	60	-	0	4	No	65	L1	increase	65	N/A	N/A	N/A	N/A	N/A	P	
11	230	60	-	0	4	No	65	L2	increase	N/A	65	N/A	N/A	N/A	N/A	P	
12	230	60	-	0	4	No	65	L3	increase	N/A	N/A	65	N/A	N/A	N/A	P	
Supplementary information:																	

IEC 60947-6-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.4	TABLE: Operation on deviation of source II supply characteristics I-1																	
	Ambient: 22, 8(ºC)																	
	Specified accuracy (U): ±10%																	
	Specified accuracy (f): ±1Hz																	
	Test case									Reference value				ATS measurement errors				
Test No	Deviation monitoring 1), 2), 3), 4), 5), 6)	Rated phase voltage V	Rated Frequency Hz	Threshold %	Time delay s	Number of phases	N connection Yes/No	Limit value V/Hz	Tested phases L1/L2/L3	L1 V	L2 V	L3 V	f Hz	L1 %	L2 %	L3 %	f %	Verdict
1	1)	230	50	-	0	4	No	187V	L1	198	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
2	1)	230	50	-	0	4	No	187V	L2	N/A	198	N/A	N/A	N/A	N/A	N/A	N/A	P
3	1)	230	50	-	0	4	No	187V	L3	N/A	N/A	198	N/A	N/A	N/A	N/A	N/A	P
4	2)	230	50	-	0	4	No	263V	L1	248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
5	2)	230	50	-	0	4	No	263V	L2	N/A	248	N/A	N/A	N/A	N/A	N/A	N/A	P
6	2)	230	50	-	0	4	No	263V	L3	N/A	N/A	248	N/A	N/A	N/A	N/A	N/A	P
7	3)	230	50	-	0	4	No	45Hz	L1	206	N/A	N/A	47	N/A	N/A	N/A	N/A	P
8	3)	230	50	-	0	4	No	45Hz	L2	N/A	206	N/A	47	N/A	N/A	N/A	N/A	P
9	3)	230	50	-	0	4	No	45Hz	L3	N/A	N/A	206	47	N/A	N/A	N/A	N/A	P
10	4)	230	50	-	0	4	No	187V	L1	203	N/A	N/A	47	N/A	N/A	N/A	N/A	P
11	4)	230	50	-	0	4	No	187V	L2	N/A	203	N/A	47	N/A	N/A	N/A	N/A	P
12	4)	230	50	-	0	4	No	187V	L3	N/A	N/A	203	47	N/A	N/A	N/A	N/A	P
13	5)	230	50	-	0	4	No	55Hz	L1	236	N/A	N/A	53	N/A	N/A	N/A	N/A	P
14	5)	230	50	-	0	4	No	55Hz	L2	N/A	236	N/A	53	N/A	N/A	N/A	N/A	P
15	5)	230	50	-	0	4	No	55Hz	L3	N/A	N/A	236	53	N/A	N/A	N/A	N/A	P
16	6)	230	50	-	0	4	No	263V	L1	253	N/A	N/A	53	N/A	N/A	N/A	N/A	P
17	6)	230	50	-	0	4	No	263V	L2	N/A	253	N/A	53	N/A	N/A	N/A	N/A	P
18	6)	230	50	-	0	4	No	263V	L3	N/A	N/A	253	53	N/A	N/A	N/A	N/A	P

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Clause	Requirement + Test	Result - Remark	Verdict

19	1)	230	60	-	0	4	No	187V	L1	203	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
20	1)	230	60	-	0	4	No	187V	L2	N/A	203	N/A	N/A	N/A	N/A	N/A	N/A	P
21	1)	230	60	-	0	4	No	187V	L3	N/A	N/A	203	N/A	N/A	N/A	N/A	N/A	P
22	2)	230	60	-	0	3	No	263V	L1	244	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
23	2)	230	60	-	0	4	No	263V	L2	N/A	244	N/A	N/A	N/A	N/A	N/A	N/A	P
24	2)	230	60	-	0	4	No	263V	L3	N/A	N/A	244	N/A	N/A	N/A	N/A	N/A	P
25	3)	230	60	-	0	4	No	50Hz	L1	206	N/A	N/A	52	N/A	N/A	N/A	N/A	P
26	3)	230	60	-	0	4	No	50Hz	L2	N/A	206	N/A	52	N/A	N/A	N/A	N/A	P
27	3)	230	60	-	0	4	No	50Hz	L3	N/A	N/A	206	52	N/A	N/A	N/A	N/A	P
28	4)	230	60	-	0	4	No	187V	L1	202	N/A	N/A	52	N/A	N/A	N/A	N/A	P
29	4)	230	60	-	0	4	No	187V	L2	N/A	202	N/A	52	N/A	N/A	N/A	N/A	P
30	4)	230	60	-	0	4	No	187V	L3	N/A	N/A	202	52	N/A	N/A	N/A	N/A	P
31	5)	230	60	-	0	4	No	65Hz	L1	236	N/A	N/A	63	N/A	N/A	N/A	N/A	P
32	5)	230	60	-	0	4	No	65Hz	L2	N/A	236	N/A	63	N/A	N/A	N/A	N/A	P
33	5)	230	60	-	0	4	No	65Hz	L3	N/A	N/A	236	63	N/A	N/A	N/A	N/A	P
34	6)	230	60	-	0	4	No	263V	L1	249	N/A	N/A	63	N/A	N/A	N/A	N/A	P
36	6)	230	60	-	0	4	No	263V	L2	N/A	249	N/A	63	N/A	N/A	N/A	N/A	P
36	6)	230	60	-	0	4	No	263V	L3	N/A	N/A	249	63	N/A	N/A	N/A	N/A	P

Supplementary information:

1) clause 9.2.3.3.4 a) increasing the voltage of source II 2) clause 9.2.3.3.4 a) decreasing the voltage of source II

3) clause 9.2.3.3.4 b) 1) 4) clause 9.2.3.3.4 b) 2) 5) clause 9.2.3.3.4 b) 3) 6) clause 9.2.3.3.4 b) 4)

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.4	**TABLE: Operation on deviation of source II supply characteristics I-2**																	
	Ambient: 23, 0(ºC)																	
	Specified accuracy (U): ±10%																	
	Specified accuracy (f): -																	
	Test case									Reference value				ATS measurement errors				
Test No	Deviation monitoring 1), 2), 3), 4), 5), 6)	Rated phase voltage V	Rated Frequency Hz	Threshold %	Time delay s	Number of phases	N connection Yes/No	Limit value V/Hz	Tested phases L1/L2/L3	L1 V	L2 V	L3 V	f Hz	L1 %	L2 %	L3 %	f %	Verdict
1	1)	230	50	-	0	4	No	187V	L1	201	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
2	1)	230	50	-	0	4	No	187V	L2	N/A	201	N/A	N/A	N/A	N/A	N/A	N/A	P
3	1)	230	50	-	0	4	No	187V	L3	N/A	N/A	201	N/A	N/A	N/A	N/A	N/A	P
4	2)	230	50	-	0	4	No	263V	L1	248	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
5	2)	230	50	-	0	4	No	263V	L2	N/A	248	N/A	N/A	N/A	N/A	N/A	N/A	P
6	2)	230	50	-	0	4	No	263V	L3	N/A	N/A	248	N/A	N/A	N/A	N/A	N/A	P
7	1)	230	60	-	0	4	No	187V	L1	202	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
8	1)	230	60	-	0	4	No	187V	L2	N/A	202	N/A	N/A	N/A	N/A	N/A	N/A	P
9	1)	230	60	-	0	4	No	187V	L3	N/A	N/A	202	N/A	N/A	N/A	N/A	N/A	P
10	2)	230	60	-	0	4	No	263V	L1	251	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P
11	2)	230	60	-	0	4	No	263V	L2	N/A	251	N/A	N/A	N/A	N/A	N/A	N/A	P
12	2)	230	60	-	0	4	No	263V	L3	N/A	N/A	251	N/A	N/A	N/A	N/A	N/A	P
Supplementary information:																		
1) clause 9.2.3.3.4 a) increasing the voltage of source II 2) clause 9.2.3.3.4 a) decreasing the voltage of source II																		
3) clause 9.2.3.3.4 b) 1) 4) clause 9.2.3.3.4 b) 2) 5) clause 9.2.3.3.4 b) 3) 6) clause 9.2.3.3.4 b) 4)																		

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.3.5	**TABLE: Operation with in-phase transfer control function**																							
	Ambient: (ºC)																							
	Specified accuracy (U): %																							
	Specified accuracy (f): %																							
	Specified accuracy (°): %																							
	Test case									Reference value							ATS measurement errors							
Test No	Rated phase voltage V	Rated Freq. Hz	Rated Phase angle °	Thres hold %	Time delay s	Number of phases	N connection Yes/No	Limit value V/Hz/°	Tested phases L1/L2/L3	L1 V	L2 V	L3 V	f Hz	L1 °	L2 °	L3 °	L1 %	L2 %	L3 %	f %	L1	L2	L3	Verdict
																								N/A
Supplementary information:																								

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.3.5	**TABLE: Temperature-rise**		P
	Test sample..... :	4P_I-1	—
	Main circuit / Auxiliary circuit ..... :	Position I	—
	Ambient (°C)..... :	23, 5 °C	—
	Ithe / Ith / Ie (A) ..... :	-/2000A/2000A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	58, 7	65
Terminal Line B	60, 1	65
Terminal Line C	61, 0	65
Terminal Line N	58, 7	65
Terminal Load A	58, 6	65
Terminal Load B	60, 5	65
Terminal Load C	60, 5	65
Terminal Load N	58, 3	65
Handle	7, 0	25
Cover	16, 4	40
Base	34, 6	50
Supplementary information:		

9.2.3.5	**TABLE: Temperature-rise**		P
	Test sample..... :	4P_I-2	—
	Main circuit / Auxiliary circuit ..... :	Position II	—
	Ambient (°C)..... :	23, 8 °C	—
	Ithe / Ith / Ie (A) ..... :	-/3200A/3200A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	54, 9	65
Terminal Line B	56, 9	65
Terminal Line C	57, 8	65
Terminal Line N	55, 7	65
Terminal Load A	54, 7	65

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Clause	Requirement + Test	Result - Remark	Verdict

Terminal Load B	56, 4	65
Terminal Load C	56, 5	65
Terminal Load N	54, 8	65
Handle	6, 3	25
Cover	15, 2	40
Base	33, 8	50
Supplementary information:		

9.2.3.5	**TABLE: Temperature-rise**		P
	Test sample..... :	4P_I-3	—
	Main circuit / Auxiliary circuit ..... :	Position II	—
	Ambient (°C)..... :	23, 8 °C	—
	Ithe / Ith / Ie (A) ..... :	-/2500A/1250A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	58	65
Terminal Line B	60	65
Terminal Line C	59	65
Terminal Line N	58	65
Terminal Load A	57	65
Terminal Load B	58	65
Terminal Load C	57	65
Terminal Load N	56	65
Handle	2	25
Cover	17	40
Base	23	50
Supplementary information:		

9.2.3.6 a)	**TABLE: Verification of impulse withstand voltage**	P

Test voltage applied between:	**Test voltage Uimp (kV)**	**Breakdown / flashover (Yes/No)**
Between the line and load terminals of the equipment with the contacts in the open position	18, 5	No
Between all the terminals of the main circuit connected together (including the control and auxiliary circuit connected to the main circuit) and the enclosure or mounting plate	14, 8	No

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Clause	Requirement + Test	Result - Remark	Verdict

Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate	14, 8	No
Between all terminals of source I connected together, and all terminals of source II connected together, once with the TSE in position I and once with the TSE in position II	14, 8	No
In the “OFF” position, with the test voltage applied across the poles of the main circuit, the line terminals of source I and source II being connected together and the load terminals being connected together	14, 8	No
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit and the other circuits connected together	2, 95	No
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit and the exposed conductive parts and the enclosure or mounting plate connected together	2, 95	No
Supplementary information:		

9.2.3.6 b)	**TABLE: Power-frequency or DC withstand verification**		P
Test voltage applied between:		**Test voltage (V)**	**Breakdown / flashover (Yes/No)**
Between the line and load terminals of the equipment with the contacts in the open position		AC2200V	No
Between all the terminals of the main circuit connected together (including the control and auxiliary circuit connected to the main circuit) and the enclosure or mounting plate		AC2200V	No
Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate		AC2200V	No
Between all terminals of source I connected together, and all terminals of source II connected together, once with the TSE in position I and once with the TSE in position II		AC2200V	No
In the “OFF” position, with the test voltage applied across the poles of the main circuit, the line terminals of source I and source II being connected together and the load terminals being connected together		AC2200V	No
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit and the other circuits connected together		AC1500V	No
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit and the exposed conductive parts and the enclosure or mounting plate connected together		AC1500V	No
Supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.4.4	**TABLE: Temperature-rise**		**P**
	Test sample..... :	II-1	—
	Main circuit / Auxiliary circuit ..... :	Position I	—
	Ambient (°C)..... :	22, 6 °C	—
	Ithe / Ith / Ie (A) ..... :	2000A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	59	80
Terminal Line B	59	80
Terminal Line C	58	80
Terminal Line N	57	80
Terminal Load A	56	80
Terminal Load B	58	80
Terminal Load C	57	80
Terminal Load N	56	80
Handle	1	35
Cover	12	50
Base	18	60
Supplementary information:		

9.2.4.4	**TABLE: Temperature-rise**		**P**
	Test sample..... :	II-2	—
	Main circuit / Auxiliary circuit ..... :	Position I	—
	Ambient (°C)..... :	22, 8 °C	—
	Ithe / Ith / Ie (A) ..... :	-/3200A/1600A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	62	80
Terminal Line B	63	80
Terminal Line C	60	80
Terminal Line N	60	80
Terminal Load A	57	80

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Clause	Requirement + Test	Result - Remark	Verdict

Terminal Load B	59	80
Terminal Load C	56	80
Terminal Load N	56	80
Handle	2	35
Cover	16	50
Base	23	60
Supplementary information:		

9.2.5.6	**TABLE: Temperature-rise**		P
	Test sample..... :	III-1	—
	Main circuit / Auxiliary circuit ..... :	Position I	—
	Ambient (°C)..... :	22, 7 °C	—
	Ithe / Ith / Ie (A) ..... :	2000A	—
	Test voltage (V) ..... :	-	—

Thermocouple Locations	**dT (K) measured**	**dT (K) required**
Terminal Line A	58	80
Terminal Line B	60	80
Terminal Line C	59	80
Terminal Line N	58	80
Terminal Load A	56	80
Terminal Load B	57	80
Terminal Load C	57	80
Terminal Load N	56	80
Handle	3	35
Cover	13	50
Base	19	60
Supplementary information:		

9.2.5.6	**TABLE: Temperature-rise**		P
	Test sample..... :	III-2	—
	Main circuit / Auxiliary circuit ..... :	Position I	—
	Ambient (°C)..... :	22, 6 °C	—
	Ithe / Ith / Ie (A) ..... :	3200A	—
	Test voltage (V) ..... :	-	—

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Clause	Requirement + Test	Result - Remark	Verdict

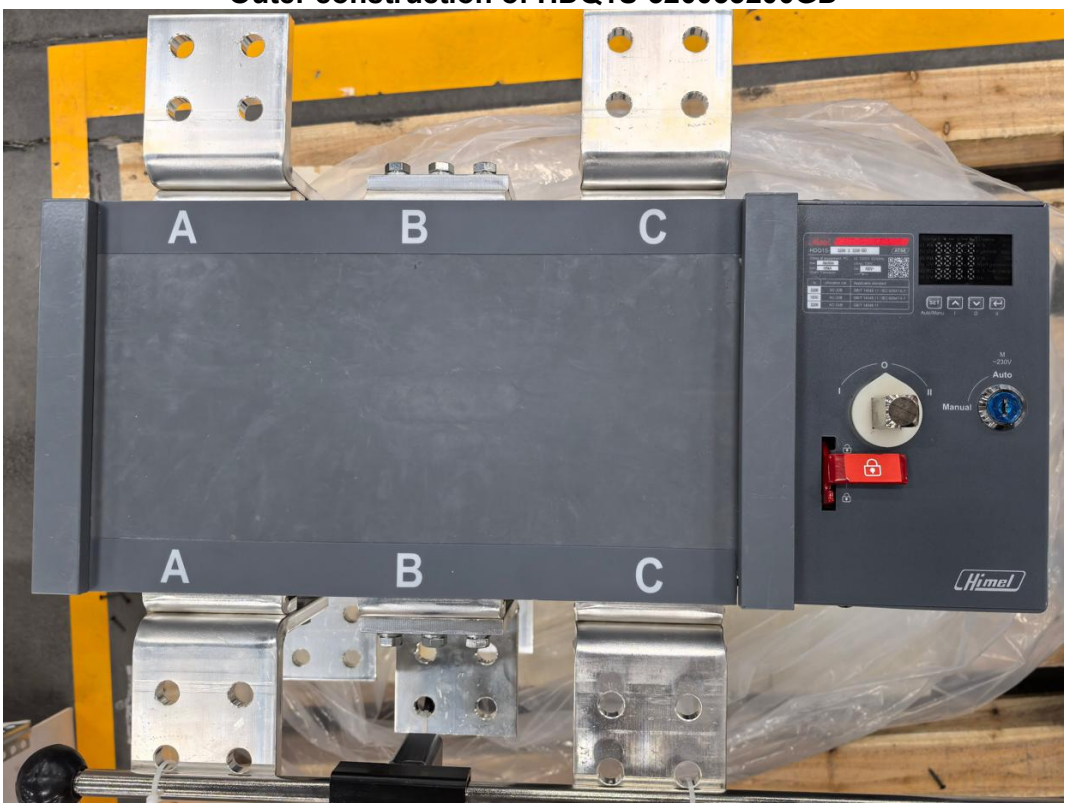
Thermocouple Locations	dT (K) measured	dT (K) required
Terminal Line A	61	80
Terminal Line B	63	80
Terminal Line C	62	80
Terminal Line N	61	80
Terminal Load A	57	80
Terminal Load B	57	80
Terminal Load C	58	80
Terminal Load N	57	80
Handle	2	35
Cover	15	50
Base	20	60
Supplementary information:		

9.2.7.3	**TABLE: Temperature-rise**		
	Test sample..... :		—
	Main circuit / Auxiliary circuit ..... :		—
	Ambient (°C)..... :		—
	Ithe / Ith / Ie (A) ..... :		—
	Test voltage (V) ..... :		—

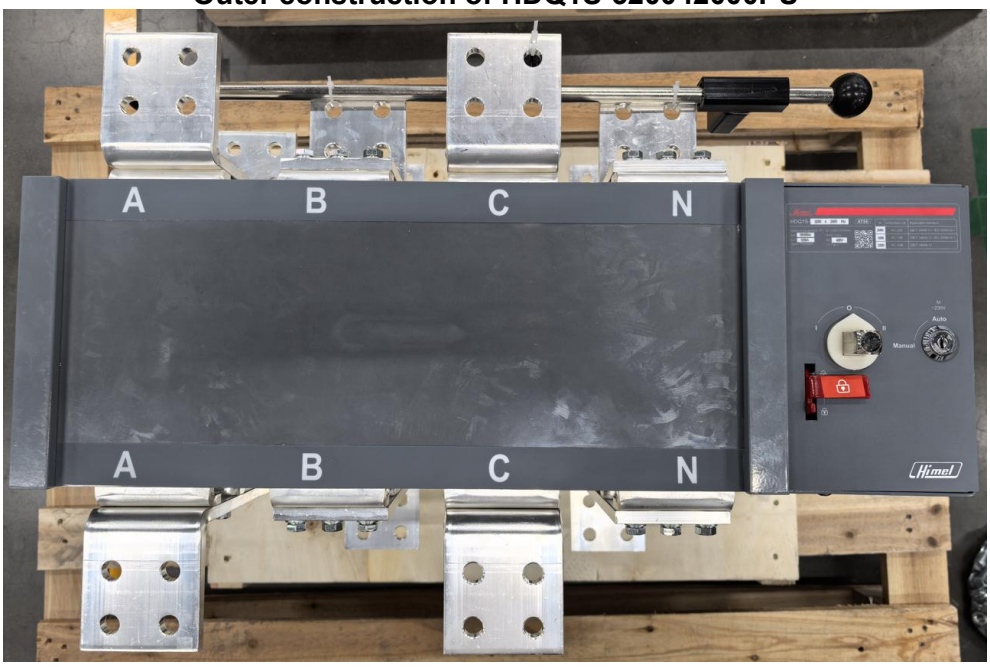
Thermocouple Locations	dT (K) measured	dT (K) required
Supplementary information:		

Attachment 1 Photo documentation

Outer construction of HDQ1S-320033200GD

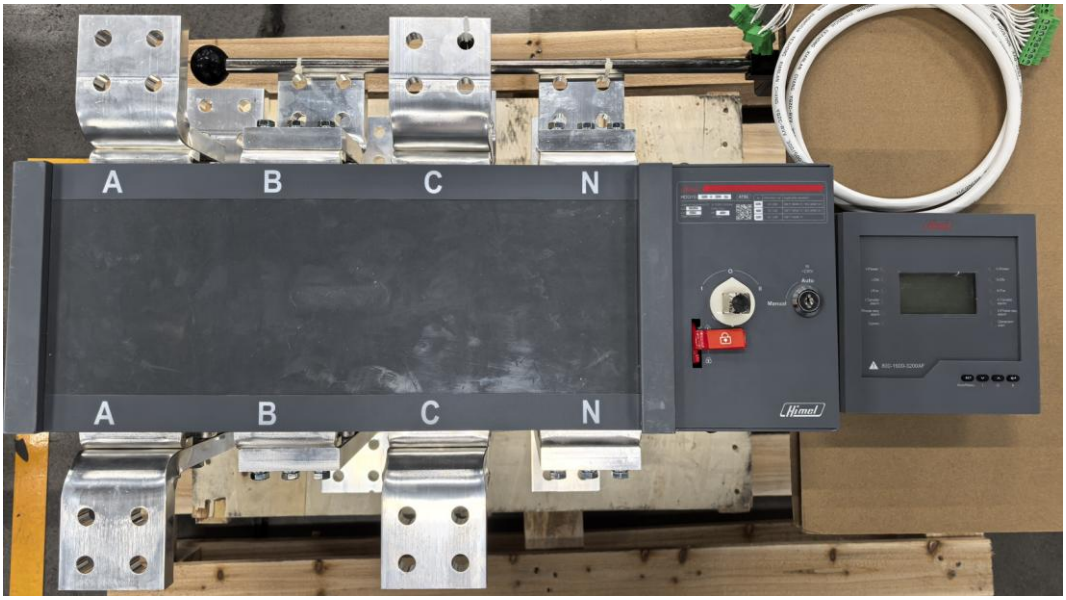


Outer construction of HDQ1S-320042000PU




I N
II N

Outer construction of HDQ1S-320042000DU



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