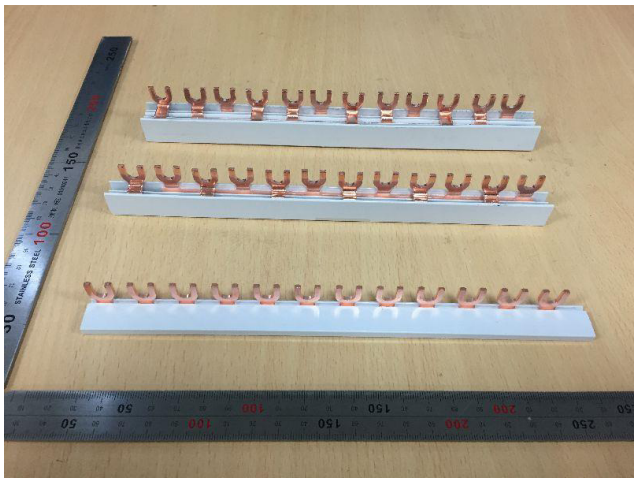
Prüfbericht-Nr.: *Test Report No.*:	**50071042 001**	**Auftrags-Nr.:** *Order No.*:	**154223013**	Seite 1 von 83 *Page 1 of 83*
Kunden-Referenz-Nr.: *Client Reference No.*:	**N/A**	**Auftragsdatum:** *Order date*:	**25.01.2017**	
Auftraggeber: *Client*:	**YUEQING KASEEY ELECTRIC CO.,LTD.** *No.56, Xi An Road, Liushi,Yueqing, Zhejiang 325604, P.R. China*			
Prüfgegenstand: *Test item*:	**Busbar**			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	**S/G-1L, S/G-2L, S/G-3L, S/G-4L**			
Auftrags-Inhalt: *Order content*:	**Coc of LVD CE**			
Prüfgrundlage: *Test specification*:	**EN 61439-6: 2012**			

Wareneingangsdatum: *Date of receipt*:	**25.01.2017**
Prüfmuster-Nr.: *Test sample No.*:	**N/A**
Prüfzeitraum: *Testing period*:	**26.01.2017 to 02.03.2017**
Ort der Prüfung: *Place of testing*:	**See page 3**
Prüflaboratorium: *Testing laboratory*:	**TÜV Rheinland (Shanghai) Co., Ltd.**
Prüfergebnis*: *Test result**:	Pass



geprüft von / *tested by*:			**kontrolliert von** / *reviewed by*:		
02.03.2017	Ding Ye / PE		02.03.2017	Wencai Zhang / PE	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

Attachment 1: Equipment Lists (1 page)

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*:	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Report issued under the responsibility of:

TEST REPORT
IEC 61439-6
Low-voltage switchgear and controlgear assemblies - Part 6: Busbar trunking systems (busways)

Report Number..... :	**50071042 001**
Date of issue ..... :	**See cover page**
Total number of pages ..... :	**See cover page**
Applicant's name ..... :	**YUEQING KASEEY ELECTRIC CO.,LTD.**
Address..... :	**No.56, Xi An Road, Liushi,Yueqing, Zhejiang 325604, P.R. China**
Test specification:	
Standard ..... :	IEC 61439-6 (First Edition): 2012
Test procedure..... :	Coc of LVD CE
Non-standard test method……..:	N/A
Test Report Form No..... :	IEC61439_6A
Test Report Form(s) Originator.... :	CQC
Master TRF ..... :	Dated 2012-12

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

Test item description..... :	**Busbar**
Trade Mark .....:	or
Manufacturer.....:	**YUEQING KASEEY ELECTRIC CO.,LTD.**
Model/Type reference.....:	**S/G-1L, S/G-2L, S/G-3L, S/G-4L**
Ratings.....:	**1P/2P/3P/4P, 63/80/100A**

Testing procedure and testing location:			
☒	**Testing Laboratory:**	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)	
Testing location/ address .....:		No 125 Miaohouwang Road Binjiang District Hangzhou, Zhejiang CHINA	
	Tested by (name + signature) .....:		
	Approved by (name + signature) ..:		
☐	**Testing procedure: TMP**		
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature) ..:		
☐	**Testing procedure: WMT**		
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Witnessed by (name + signature) .:		
	Approved by (name + signature) ..:		
☐	**Testing procedure: SMT**		
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature) ..:		
	Supervised by (name + signature) :		

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

N/A

Summary of testing:

All tests were passed.

Tests performed (name of test and test clause): **All test items**	**Testing location:** **The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)**

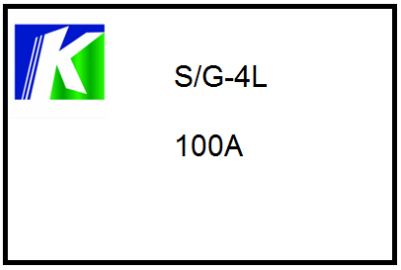
Summary of compliance with National Differences

List of countries addressed:

☒ **The product fulfils the requirements of EN 61439-6: 2012**

Copy of marking plate

With sample of S/G-4L



Test item particulars.....:	
External design .....:	N/A
Place of installation（indoor / outdoor） .....:	indoor
Service conditions （normal / special） .....:	Normal
Mobility （stationary / movable） .....:	Stationary
IP Code .....:	IP20, after installation
Mechanical loads （normal / heavy / special） .....:	Normal
Resistance to fire and flame propagation.....:	Yes
Mounting attitude.....:	⩽ 2 000 m
Pollution degree .....:	3
Ratings	
Rated operational voltage (Ue /1 ph system)……..:	230/400V
Rated operational voltage (Ue /2/3 ph system) ……...:	400V
Rated insulation voltage (Ui / all systems) ……..…:	400V
Rated impulse voltage (Uimp) :all systems……:	4,0kV
Rated current (In) …: .....:	63/80/100A
Rated short-time withstand current (Icw) ……..…:	10kA, 1s
Rated peak withstand current (Ipk) ……..…..:	17kA
Rated conditional short-circuit current (Icc) ……..…:	10kA
Rated fused short-circuit current (Icf) ……..:	N/A
Rated diversity factor (RDF) .....:	1
Rated frequency (f) …:.....:	50/60Hz
Resistance and reactance values	N/A
-R ……..……..:	//
-X ……..……..…:	//
Rating factors(k1=1 for 35°C)	
- k_{1A}……..……..……:	1
Mounting factors	
- k_{1c}……..……..……:	1
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.....:	**25.01.2017**
Date (s) of performance of tests .....:	**26.01.2017 to 05.03.2017**

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

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) ..... : YUEQING KASEEY ELECTRIC CO.,LTD.

No.56, Xi An Road, Liushi,Yueqing, Zhejiang 325604, P.R. China

General product information:

Model S/G busbar are similar product which has the same size except the pole number.

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

5	**INTERFACE CHARACTERISTICS**		**P**
5.2	**Voltage ratings**		**P**
	Rated voltage (Un) (of the BTS) ..... :	400V	-
	Rated operational voltage (Ue) ..... : (of a circuit of an BTS)	230/400V for 1P 400 for 2P/3P/4P	-
	Rated insulation voltage (Ui) ..... : (of a circuit of an BTS)	400V	P
	Rated impulse withstand voltage (Uimp) ..... : (of the BTS)	4,0kV	P
5.3	**Current ratings**		**P**
	Rated current of the BTS (InA) ..... :	63/80/100A	-
	Rated current of a circuit (Inc) ..... :	63/80/100A	-
	Rated peak withstand current (Ipk) ..... :	17kA	P
	Rated short-time withstand current (Icw) ..... : (of a circuit of an BTS)	10kA,1s	P
	Rated conditional short-circuit current of an BTS (Icc) ..... :	10kA	P
	temperature factor (k_{1A}), if applicable..... :	1	P
	temperature factor (k_{1C}), if applicable..... :	1	P
	mounting factor (k_{2C}), if applicable ..... :		N/A
5.4	**Rated diversity factor (RDF)**		P
	Rated diversity factor (RDF) ..... :	1	P
5.5	**Rated frequency (fn)**		**P**
	Rated frequency (fn) ..... :	50/60Hz	P
5.6	**Other characteristics**		**P**
	additional requirements depending on the specific service conditions of a functional unit (e.g. type of coordination, overload characteristics);		**-**
	pollution degree ..... :	**3**	**-**
	types of system earthing..... :		N/A
	indoor and/or outdoor installation ..... :	indoor	P
	stationary BTS ..... :		P
	degree of protection (IP Code) ..... :	IP20, after installation	P
	intended for use by skilled or ordinary persons..... :		N/A
	electromagnetic compatibility (EMC) classification . :		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	special service conditions ..... :		N/A
	enclosed BTS ..... :		N/A
	mechanical impact protection ..... :		P
	the type of construction – fixed / removable / withdrawable parts ..... :	fixed	P
	the nature of short-circuit protective device ..... :	AC	P
	measures for protection against electric shock..... :		P
	overall dimensions ..... :		N/A
	weight ..... :		N/A
	ability to withstand mechanical loads, normal / heavy ..... :	see 8.1.101, normal	P
	resistance to flame propagation ..... :	see 9.101	P
	fire resistance in building penetration ..... :	see 9.102	N/A
5.101	**Phase conductor and fault-loop characteristics**		N/A
	For BTS rated below 100 A, the reactances are negligible;	**For In=100A**	**P**
	Resistance of phase conductors/metre - R_{20} at a conductor temperature of 20 °C - R at an ambient air temperature of 35 °C Reactance (independent from temperature) - X Positive-sequence and negative-sequence impedances - Z_{20} at an ambient air temperature of 20 °C - Z at a conductor temperature of 35 °C		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	zero sequence impedance at an ambient air temperature of 20 °C - Z_{b20phN} ..... phase to neutral - $Z_{b20phPEN}$ ..... phase to PEN - $Z_{b20phPE}$ ..... phase to PE zero sequence impedance at a conductor temperature of 35 °C - Z_{bphN} ..... phase to neutral - Z_{bphPEN} ..... phase to PEN - Z_{bphPE} ..... phase to PE Resistance at an ambient air temperature of 20 °C - $R_{b20phph}$ ..... phase to phase - R_{b20phN} ..... phase to neutral - $R_{b20phPEN}$ ..... phase to PEN - $R_{b20phPE}$ ..... phase to PE Resistance at a conductor temperature of 35 °C - R_{bphph} ..... phase to phase - R_{bphN} ..... phase to neutral - R_{bphPEN} ..... phase to PEN - R_{bphPE} ..... phase to PE Reactance (independent from temperature) - X_{bphph} ..... phase to phase - X_{bphN} ..... phase to neutral - X_{bphPEN} ..... phase to PEN - X_{bphPE} ..... phase to PE		N/A
5.102	**The strength of the power frequency magnetic field**		N/A
	The strength of the power frequency magnetic field in the vicinity of the BT run is stated by the BTS manufacturer.		**-**
6	**INFORMATION**		**P**
6.1	**BTS designation marking**		**P**
	The following information regarding the BTS is provided on the designation label(s):		**-**
	a) BTS manufacturer's name or trade mark	see 3.10.2	**-**
	b) type designation / identification number / other means of identification	S/G-1L; S/G-2L; S/G-3L; S/G-4L	P
	c) means of identifying date of manufacture;		P
	d) IEC 61439-6.		P
	One nameplate located near one end of each BTU and one on each tap-off unit.		P
6.2	**Documentation**		**P**
6.2.1	**Information relating to the BTS**		**-**
	a) rated voltage (U_n) (of the BTS) (V)..... :	400V	**-**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	b) rated operational voltage (Ue) (of a circuit)(V).... :	230/400V for 1P 400V for 2P/3P/4P	-
	c) rated impulse withstand voltage (Uimp) (kV)..... :	4,0	-
	d) rated insulation voltage (Ui) (V)..... :	400	-
	e) rated current of the BTS (InA) (A)..... :	63/80/100	-
	f) rated current of each circuit (Inc) (A) ..... :	63/80/100	-
	g) rated peak withstand current (Ipk) (kA)..... :	17kA	-
	h) rated short-time withstand current (Icw) together with its duration (kA – s)..... :	10kA, 1s	-
	i) rated conditional short-circuit current (Icc) (kA) .. :	10kA	-
	j) rated frequency (fn) (Hz) ..... :	50/60	-
	k) rated diversity factor(s) (RDF) ..... :	1	-
	l) form of internal separation..... :	//	-
	m) types of electrical connections of functional units ..... :	//	-
6.2.2	**Instructions for handling, installation, operation and maintenance**		**P**
	The BTS manufacturer provides in documents or catalogues:		**-**
	the conditions, if any, for the handling, installation, operation and maintenance of the BTS and the equipment contained therein.		P
	the proper and correct transport, handling, installation and operation of the BTS.		P
	The provision of weight details in connection with the transport and handling of BTS.		P
	The correct location and installation of lifting means and the thread size of lifting attachments, if applicable, is given in the BTS manufacturer's documentation or the instructions on how the BTS has to be handled.		P
	The measures to be taken, if any, with regard to EMC associated with the installation, operation and maintenance of the BTS is specified (see Annex J).		N/A
	If an BTS specifically intended for environment A is to be used in environment B a warning is included in the operating instructions		N/A
	If the circuitry is not obvious from the physical arrangement of the apparatus installed, suitable information is supplied, for example wiring diagrams or tables.		N/A
6.3	**Device and/or component identification**		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Inside the BTS, it is possible to identify individual circuits and their protective devices.		N/A
	Any designations used is in compliance with IEC 81346-1 and IEC 81346-2 and identical with those used in the wiring diagrams, which is in accordance with IEC 61082-1.		N/A
7	**SERVICE CONDITIONS**		**P**
7.1	**Normal service conditions**		**P**
7.1.1	**Ambient air temperature**		**P**
7.1.1.1	**Ambient air temperature for indoor installations**		**P**
	The ambient air temperature does not exceed +40 °C and its average over a period of 24 h does not exceed +35 °C.		P
	The lower limit of the ambient air temperature is –5 °C.		P
7.1.1.2	**Ambient air temperature for outdoor installations**		**N/A**
	The ambient air temperature does not exceed +40 °C and its average over a period of 24 h does not exceed +35 °C.		N/A
	The lower limit of the ambient air temperature is –25 °C.		N/A
7.1.2	**Humidity conditions**		P
7.1.2.1	**Humidity conditions for indoor installations**		**P**
	The air is clean and its relative humidity does not exceed 50 % at a maximum temperature of +40 °C. Higher relative humidity may be permitted at lower temperatures, for example 90 % at +20 °C. Moderate condensation is taken care of, which may occasionally occur due to variations in temperature.		P
7.1.2.2	**Humidity conditions for outdoor installations**		N/A
	The relative humidity may temporarily be as high as 100 % at a maximum temperature of +25 °C.		N/A
7.1.3	**Pollution degree**		**P**
	The pollution degree refers to the environmental conditions for which the BTS is intended.	3	P
7.1.4	**Altitude**		**P**
	The altitude of the site of installation does not exceed 2 000 m.		P
7.2	**Special service conditions**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Where any special service conditions exist, the applicable particular requirements are met or special agreements are made between the BTS manufacturer and the user.	Normal service	N/A
	a) values of temperature, relative humidity and/or altitude differing from those specified in 7.1;		N/A
	b) applications where variations in temperature and/or air pressure take place at such a speed that exceptional condensation is liable to occur inside the BTS;		N/A
	c) heavy pollution of the air by dust, smoke, corrosive or radioactive particles, vapours or salt;		N/A
	d) exposure to strong electric or magnetic fields;		N/A
	e) exposure to extreme climatic conditions;		N/A
	f) attack by fungus or small creatures;		N/A
	g) installation in locations where fire or explosion hazards exist;		N/A
	h) exposure to heavy vibration and shocks;		N/A
	i) installation in such a manner that the current-carrying capacity or breaking capacity is affected, for example equipment built into machines or recessed into walls;		N/A
	j) exposure to conducted and radiated disturbances other than electromagnetic, and electromagnetic disturbances in environments other than those described in 9.4;		N/A
	k) exceptional overvoltage conditions.		N/A
	l) excessive harmonics in the supply voltage or load current.		N/A
	aa) exposure to special mechanical loads, such as lighting apparatus, additional cables, ladder supports, etc.;		N/A
	bb) applications with high repetitive overcurrent, for example resistance welding;		N/A
	cc) installation near highly sensitive IT equipment, such as high-speed data networks, radiology apparatus, workstation monitors, etc.;		N/A
	dd) applications requiring defined performance under fire conditions, e.g. circuit integrity for a definite time.		N/A
7.3	**Conditions during transport, storage and installation**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	A special agreement is made between the BTS manufacturer and the user if the conditions during transport, storage and installation, for example temperature and humidity conditions, differ from those defined in 7.1.		N/A
8	**CONSTRUCTIONAL REQUIREMENTS**		**P**
8.1	**Strength of materials and parts**		**P**
8.1.1	**General**		**P**
	BTS are constructed of materials capable of withstanding the mechanical, electrical, thermal and environmental stresses that are likely to be encountered in specified service conditions.		P
8.1.2	**Protection against corrosion**		**P**
	Protection against corrosion is ensured by the use of suitable materials or by protective coatings to the exposed surface, taking account of the intended normal service conditions of use and maintenance.		P
8.1.3	**Properties of insulating materials**		**P**
8.1.3.1	**Thermal stability**		**P**
	For enclosures or parts of enclosures made of insulating materials, thermal stability is verified according to 10.2.3.1.		P
8.1.3.2	**Resistance of insulating materials to heat and fire**		**P**
8.1.3.2.1	**General**		**P**
	Parts of insulating materials which might be exposed to thermal stresses due to internal electrical effects, and the deterioration of which might impair the safety of the BTS, are not adversely affected by normal (operational) heat, abnormal heat or fire.		P
8.1.3.2.2	**Resistance of insulating materials to heat**		**P**
	The original manufacturer shall select insulating materials either by reference to the insulation temperature index (determined for example by the methods of IEC 60216) or by compliance with IEC 60085.		P
8.1.3.2.3	**Resistance of insulating materials to abnormal heat and fire due to internal electric effects**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulating materials used for parts necessary to retain current carrying parts in position and parts which might be exposed to thermal stresses due to internal electrical effects, and the deterioration of which might impair the safety of the BTS, shall not be adversely affected by abnormal heat and fire and shall be verified by the glow-wire test in 10.2.3.2. For the purpose of this test, a protective conductor (PE) is not considered as a current-carrying part.		P
	For small parts (having surface dimensions not exceeding 14 mm x 14 mm), an alternative test may be used (e.g. needle flame test, according to IEC 60695-11-5). The same procedure may be applicable for other practical reasons where the metal material of a part is large compared to the insulating material.		N/A
8.1.4	**Resistance to ultra-violet radiation**		N/A
	For enclosures and external parts made of insulating materials which are intended to be used outdoor, resistance to ultra-violet radiation is verified according to 10.2.4.		N/A
8.1.5	**Mechanical strength**		**P**
	All enclosures or partitions including locking means and hinges for doors are of a mechanical strength sufficient to withstand the stresses to which they may be subjected in normal service, and during short-circuit conditions (see 10.13).		P
	The mechanical operation of removable parts, including any insertion interlock, is verified by test according to 10.13.		N/A
	BTS with trolley-type tap-off facilities shall be able to carry out successfully 10 000 cycles of to-and-fro movements along the conductors of the BT run, with the sliding contacts carrying their rated current at rated voltage. In the case of a.c., the power factor of the load shall be between 0,75 and 0,8.		N/A
	Compliance to this requirement is checked by the test of 10.13.		P
8.1.6	**Lifting provision**		**P**
	Where required, BTS are provided with the appropriate provision for lifting.		P
	Compliance is checked according to the test of 10.2.5.		P
8.1.101	**Ability to withstand mechanical loads**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	BTS intended for horizontal installation shall be able to withstand in use normal or heavy mechanical loads as specified according to 5.6 aa).		P
	Normal mechanical loads include the weight of the feeder unit, if not supported by its own separate fixings, and tap-off units, in addition to the weight of the BTUs.		P
	Heavy mechanical loads include additional loads such as the weight of a person.		N/A
	The necessary mechanical properties may be obtained by the choice of material, its thickness, its shape, and/or by the number of and position of fixing points as indicated by the original manufacturer.		P
8.1.102	**8.1.102 Ability of plug-in tap-off units to withstand thermal variations**		**N/A**
	Plug-in tap-off units in which the contact force is developed by the deflection of a spring member shall be able to withstand the mechanical constraints due to temperature variations when subjected to intermittent duty.		N/A
8.2	**Degree of protection provided by an BTS enclosure**		**P**
8.2.1	**Protection against mechanical impact**		**N/A**
	Where a degree of protection against mechanical impact according to IEC 62262 IK code is declared by the original manufacturer, the BTS shall be so designed that it is capable of withstanding the test according to IEC 62262 IK code (see 10.2.6).		N/A
8.2.2	**Protection against contact with live parts, ingress of solid foreign bodies and liquids**		**P**
	The degree of protection provided by any BTS against contact with live parts, ingress of solid foreign bodies and liquid is indicated by the IP code according to IEC 60529 and verified according to 10.3		P
	The degree of protection of an enclosed BTS is at least IP 2X, after installation in accordance with the BTS manufacturer's instructions. The degree of protection provided from the front of a dead front BTS is at least IP XXB.	IP20	P
	For BTS for outdoor use having no supplementary protection, the second characteristic numeral is at least 3.		N/A
	Unless otherwise specified, the degree of protection indicated by the BTS manufacturer applies to the complete BTS when installed in accordance with the BTS manufacturer's instructions, for example sealing of the open mounting surface of an BTS, etc.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Where the BTS does not have the same IP rating		N/A
	Enclosed BTS, for outdoor and indoor installation, intended for use in locations with high humidity and temperatures varying within wide limits, are provided with suitable arrangements (ventilation and/or internal heating, drain holes, etc.) to prevent harmful condensation within the BTS. However, the specified degree of protection is the same time maintained.		N/A
8.2.3	**Degree of protection of removable parts**		N/A
	The degree of protection indicated for BTS normally applies to the connected position (see 3.2.3) of removable parts.		N/A
	If, after the removal of a removable part, the original degree of protection is not maintained, an agreement is made between the BTS manufacturer and the user as to what measures are taken to ensure adequate protection. Information provided by the BTS manufacturer may take the place of such an agreement.		N/A
8.3	**Clearances and creepage distances**		**P**
	The requirements for clearances and creepage distances are based on the principles of IEC 60664-1 and are intended to provide insulation co-ordination within the installation.		P
	The clearances and creepage distances of equipment that form part of the BTS comply with the requirements of the relevant product standard.		P
	When incorporating equipment into the BTS, the specified clearances and creepage distances are maintained during normal service conditions.		P
	For dimensioning clearances and creepage distances between separate circuits, the highest voltage ratings is used (rated impulse withstand voltage for clearances and rated insulation voltage for creepage distances).		P
	The clearances and creepage distances apply to phase to phase, phase to neutral, and except where a conductor is connected directly to earth, phase to earth and neutral to earth.		P
	For bare live conductors and terminations (e.g. busbars, connections between equipment and cable lugs), the clearances and creepage distances are at least equivalent to those specified for the equipment with which they are directly associated.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The effect of a short-circuit up to and including the declared rating(s) of the BTS does not reduce permanently the clearances or creepage distances between busbars and/or connections, below the values specified for the BTS. Deformation of parts of the enclosure or of the internal partitions, barriers and obstacles due to a short-circuit do not reduce permanently the clearances or creepage distances below those specified in 8.3.2 and 8.3.3 (see also 10.11.5.5).		P
8.3.2	**Clearances**		**P**
	The clearances are sufficient to enable the declared rated impulse withstand voltage (Uimp) of a circuit to be achieved. The clearances is as specified in Table 1 unless a design verification test and routine impulse withstand voltage test is carried out in accordance with 10.9.3 and 11.3, respectively.		P
	Clearances of supplementary insulation shall be not less than those specified for basic insulation. Clearances of reinforced insulation shall be dimensioned to the rated impulse voltage one step higher than those specified for basic insulation.		P
8.3.3	**Creepage distances**		**P**
	The original manufacturer selects a rated insulation voltage(s) (Ui) for the circuits of the BTS from which the creepage distance(s) are determined. For any given circuit the rated insulation voltage is not less than the rated operational voltage (Ue).		P
	Creepage distances of supplementary insulation shall be not less than those specified for basic insulation. Creepage distances of reinforced insulation shall be twice those specified for basic insulation		N/A
	The creepage distances are not less than the associated minimum clearances.		P
8.4	**Protection against electric shock**		**P**
8.4.2	**Basic protection**		**P**
	Basic protection can be achieved either by appropriate constructional measures on the BTS itself or by additional measures to be taken during installation; this may require information to be given by the BTS manufacturer.		P
	Where basic protection is achieved by constructional measures one or more of the protective measures given in 8.4.2.2 and 8.4.2.3 may be selected.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The choice of the protective measure is declared by the BTS manufacturer if not specified within the relevant BTS standard.		N/A
8.4.2.2	**Basic insulation provided by insulating material**		**P**
	Hazardous live parts are completely covered with insulation that can only be removed by destruction.		P
	The insulation is made of suitable materials capable of durably withstanding the mechanical, electrical and thermal stresses to which the insulation may be subjected in service.		P
	Paints, varnishes and lacquers alone are not considered to satisfy the requirements for basic insulation.		P
8.4.2.3	**Barriers or enclosures**		**N/A**
	Air insulated live parts are inside enclosures or behind barriers providing at least a degree of protection of IP XXB.		N/A
	Horizontal top surfaces of accessible enclosures having a height equal to or lower than 1,6 m above the standing area, provide a degree of protection of at least IP XXD.		N/A
	Barriers and enclosures are firmly secured in place and have sufficient stability and durability to maintain the required degrees of protection and appropriate separation from live parts under normal service conditions, taking account of relevant external influences. The distance between a conductive barrier or enclosure and the live parts they protect is not less than the values specified for the clearances and creepage distances in 8.3.		N/A
	Where it is necessary to remove barriers or open enclosures or to remove parts of enclosures, this is possible only if one of the conditions a) to c) is fulfilled:		N/A
	a) By the use of a key or tool, i.e. any mechanical aid, to open the door, cover or override an interlock.		N/A
	b) After isolation of the supply to live parts, against which the barriers or enclosures afford basic protection, restoration of the supply being possible only after replacement or reclosure of the barriers or enclosures. In TN-C systems, the PEN conductor is not be isolated or switched. In TN-S systems and TN-C-S systems the neutral conductors need not be isolated or switched (see IEC 60364-5-53, 536.1.2).		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Where an intermediate barrier providing a degree of protection of at least IP XXB prevents contact with live parts, such a barrier being removable only by the use of a key or tool.		N/A
8.4.3	**Fault protection**		**N/A**
8.4.3.1	**Installation conditions**		**N/A**
	The BTS includes protective measures and is suitable for installations designed to be in accordance with IEC 60364-4-41.		N/A
	Protective measures suitable for particular installations (e.g. railways, ships) are subject to agreement between the BTS manufacturer and the user.		N/A
8.4.3.2	**Protection by automatic disconnection of the supply**		**N/A**
	Each BTS has a protective conductor to facilitate automatic disconnection of the supply for:		N/A
	a) protection against the consequences of faults (e.g. failure of basic insulation) within the BTS;		N/A
	b) protection against the consequences of faults (e.g. failure of basic insulation) in external circuits supplied through the BTS.		N/A
8.4.3.2.2	**Requirements for earth continuity providing protection against the consequences of faults within the BTS**		**N/A**
	All exposed conductive parts of the BTS are interconnected together and to the protective conductor of the supply or via an earthing conductor to the earthing arrangement.		N/A
	These interconnections may be achieved either by metal screwed connections, welding or other conductive connections or by a separate protective conductor. In the case of a separate protective conductor Table 3 is used.		N/A
	For the continuity of these connections the following is applied:		N/A
	a) When a part of the BTS is removed, for example for routine maintenance, the protective circuits (earth continuity) for the remainder of the BTS is not interrupted. Means used for assembling the various metal parts of an BTS are considered sufficient for ensuring continuity of the protective circuits if the precautions taken guarantee permanent good conductivity.		N/A
	Flexible or pliable metal conduits are not used as protective conductors unless they are designed for that purpose.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	b) For lids, doors, cover plates and the like, the usual metal screwed connections and metal hinges are considered sufficient to ensure continuity provided that no electrical equipment exceeding the limits of extra low voltage (ELV) is attached to them.		N/A
	If apparatus with a voltage exceeding the limits of extra-low voltage are attached to lids, doors, or cover plates additional measures are taken to ensure earth continuity. These parts are fitted with a protective conductor (PE) whose cross-sectional area is in accordance with Table 3 depending on the highest rated operational current Ie of the apparatus attached or, if the rated operational current of the attached apparatus is less than or equal to 16 A, an equivalent electrical connection especially designed and verified for this purpose (sliding contact, hinges protected against corrosion).		N/A
	Exposed conductive parts of a device that cannot be connected to the protective circuit by the fixing means of the device are connected to the protective circuit of the BTS by a conductor whose cross-sectional area is chosen according to Table 3.		N/A
	Certain exposed conductive parts of an BTS that do not constitute a danger –either because they cannot be touched on large surfaces or grasped with the hand, – or because they are of small size (approximately 50 mm by 50 mm) or so located as to exclude any contact with live parts, need not be connected to a protective conductor. This applies to screws, rivets and nameplates. It also applies to electromagnets of contactors or relays, magnetic cores of transformers, certain parts of releases, or similar, irrespective of their size.		N/A
	When removable parts are equipped with a metal supporting surface, these surfaces are considered sufficient for ensuring earth continuity of protective circuits provided that the pressure exerted on them is sufficiently high.		N/A
8.4.3.2.3	**Requirements for protective conductors providing protection against the consequences of faults in external circuits supplied through the BTS**		N/A
	A protective conductor within the BTS is so designed that it is capable of withstanding the highest thermal and dynamic stresses arising from faults in external circuits at the place of installation that are supplied through the BTS. Conductive structural parts may be used as a protective conductor or a part of it.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	In principle, with the exception of the cases mentioned below, protective conductors within an BTS does not include a disconnecting device (switch, disconnector, etc.):		N/A
	In the run of protective conductors links are permitted which are removable by means of a tool and accessible only to authorized personnel (these links may be required for certain tests).		N/A
	Where continuity can be interrupted by means of connectors or plug-and-socket devices, the protective circuit can be interrupted only after the live conductors have been interrupted and continuity is established before the live conductors are reconnected.		N/A
	In the case of an BTS containing structural parts, frameworks, enclosures, etc., made of conducting material, a protective conductor, if provided, need not be insulated from these parts. Conductors to certain protective devices including the conductors connecting them to a separate earth electrode are insulated. This applies for instance to voltage-operated fault detection devices and can also apply to the earth connection of the transformer neutral.		N/A
	The cross-sectional area of protective conductors (PE, PEN) in an BTS to which external conductors are intended to be connected are not less than the value calculated with the aid of the formula indicated in Annex B using the highest fault current and fault duration that may occur and taking into account the limitation of the short-circuit protective devices (SCPDs) that protect the corresponding live conductors (see 10.11.5.6).		N/A
	For PEN conductors, the following additional requirements apply:		N/A
	– the minimum cross-sectional area is 10 mm^2 copper or 16 mm^2 aluminium;		N/A
	– the PEN conductor has a cross-sectional area not less than that required for a neutral conductor (see 8.6.1);		N/A
	– the PEN conductors need not be insulated within an BTS;		N/A
	– structural parts are not used as a PEN conductor. However, mounting rails made of copper or aluminium may be used as PEN conductors;		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	– for certain applications in which the current in the PEN conductor may reach high values, for example large fluorescent lighting installations, a PEN conductor having the same or higher current-carrying capacity as the phase conductors may be necessary, subject to special agreement between the BTS manufacturer and the user.		N/A
	In BTS with trolley tap-off facilities, constructional precautions shall be taken to ensure good and permanent conductivity between the exposed conductive parts of tap-off units and the stationary exposed conductive parts, in particular when the enclosure of the fixed units is part of the protective circuit of the installation.		N/A
8.4.3.3	**Electrical separation**		**P**
	Electrical separation of individual circuits is intended to prevent electrical shock through contact with exposed-conductive-parts, which may be energized by a fault in basic insulation of the circuit. For this type of protection, see Annex K.		P
8.4.4	**Protection by total insulation**		**N/A**
	For protection, by total insulation, against indirect contact the following requirements are met.		N/A
	a) The apparatus is completely enclosed in insulating material which is equivalent of double or reinforced insulation. The enclosure carries the symbol ⧈ which is visible from the outside.		N/A
	b) The enclosure is at no point pierced by conducting parts in such a manner that there is the possibility of a fault voltage being brought out of the enclosure.		N/A
	This means that metal parts, such as actuator shafts which for constructional reasons have to be brought through the enclosure, are insulated on the inside or the outside of the enclosure from the live parts for the maximum rated insulation voltage and the maximum rated impulse withstand voltage of all circuits in the BTS.		N/A
	If an actuator is made of metal (whether covered by insulating material or not), it is provided with insulation rated for the maximum rated insulation voltage and the maximum impulse withstand voltage of all circuits in the BTS.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	If an actuator is principally made of insulating material, any of its metal parts which may become accessible in the event of insulation failure are also insulated from live parts for the maximum rated insulation voltage and the maximum rated impulse withstand voltage of all circuits in the BTS.		N/A
	c) The enclosure, when the BTS is ready for operation and connected to the supply, encloses all live parts, exposed conductive parts and parts belonging to a protective circuit in such a manner that they cannot be touched. The enclosure gives at least the degree of protection IP 2XC (see IEC 60529)		N/A
	If a protective conductor, which is extended to electrical equipment connected to the load side of the BTS, is to be passed through an BTS whose exposed conductive parts are insulated, the necessary terminals for connecting the external protective conductors are provided and identified by suitable marking.		N/A
	Inside the enclosure, the protective conductor and its terminal are insulated from the live parts and the exposed conductive parts in the same way as the live parts are insulated.		N/A
	d) Exposed conductive parts within the BTS are not connected to the protective circuit, i.e. they are not included in a protective measure involving the use of a protective circuit. This applies also to built-in apparatus, even if they have a connecting terminal for a protective conductor.		N/A
	e) If doors or covers of the enclosure can be opened without the use of a key or tool, a barrier of insulating material is provided that will afford protection against unintentional contact not only with the accessible live parts, but also with the exposed conductive parts that are only accessible after the cover has been opened; this barrier, however, is not removable except with the use of a tool.		N/A
8.4.5	**Limitation of steady-state touch current and charge**		**N/A**
	If the BTS contains items of equipment that may have steady-state touch current and charges after they have been switched off (capacitors, etc.) a warning plate is required.		N/A
	Small capacitors such as those used for arc extinction, for delaying the response of relays, etc., are not considered dangerous.		N/A
8.4.6	**Operating and servicing conditions**		**P**
8.4.6.1	**Devices to be operated or components to be replaced by ordinary persons**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Protection against any contact with live parts is maintained when operating devices or when replacing components.		P
	Openings larger than those defined by degree of protection IP XXC are allowed during the replacement of certain lamps or fuselinks.		N/A
8.4.6.2	**Requirements related to accessibility in service by authorized persons**		**N/A**
	If, for reasons of operation, the BTS is fitted with a device permitting authorized persons to obtain access to live parts while the equipment is live (e.g by overriding the interlock or using a tool), the interlock is automatically restored on reclosing the door(s).		N/A
8.4.6.2.2	**Requirements related to accessibility for inspection and similar operations**		**P**
	The BTS is constructed in such a way that certain operations, according to agreement between the BTS manufacturer and the user, can be performed when the BTS is in service and under voltage.		P
	Such operations may consist of:		P
	– visual inspection of switching devices and other apparatus, settings and indicators of relays and releases, conductor connections and marking;		P
	– adjusting and resetting of relays, releases and electronic devices;		N/A
	– replacement of fuse-links;		N/A
	– replacement of indicating lamps;		N/A
	– certain fault location operations, for example voltage and current measuring with suitably designed and insulated devices.		N/A
8.4.6.2.3	**Requirements related to accessibility for maintenance**		**N/A**
	To enable maintenance as agreed upon between the BTS manufacturer and the user on an isolated functional unit or isolated group of functional units in the BTS, with adjacent functional units or groups still under voltage, necessary measures are taken.		N/A
	The choice depends on such factors as service conditions, frequency of maintenance, competence of the authorized person, as well as local installation rules. Such measures may include:		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	– sufficient space between the actual functional unit or group and adjacent functional units or groups. It is recommended that parts likely to be removed for maintenance have, as far as possible, retainable fastening means;		N/A N/A
	– use of barriers or obstacles designed and arranged to protect against direct contact with equipment in adjacent functional units or groups;		N/A
	– use of terminal shields;		N/A
	– use of compartments for each functional unit or group;		N/A
	– insertion of additional protective means provided or specified by the BTS manufacturer.		N/A
8.4.6.2.4	**Requirements related to accessibility for extension under voltage**		**N/A**
	When it is required to enable future extension of an BTS with additional functional units or groups, with the rest of the BTS still under voltage, the requirements specified in 8.4.5.2.3 apply, subject to agreement between the BTS manufacturer and the user.		N/A
	These requirements also apply for the insertion and connection of additional outgoing cables when the existing cables are under voltage.		N/A
	The extension of busbars and connection of additional units to their incoming supply are not made under voltage, unless the BTS is designed for this purpose.		N/A
8.4.6.2.5	**Obstacles**		**N/A**
	Obstacles prevent either:		N/A
	– unintentional bodily approach to live parts, or		N/A
	– unintentional contact with live parts during the operation of live equipment in normal service.		N/A
	Obstacles may be removed without using a key or tool but are so secured as to prevent unintentional removal. The distance between a conductive obstacle and the live parts they protect is not less than the values specified for the clearances and creepage distances in 8.3.		N/A
	Where a conductive obstacle is separated from hazardous live parts by basic protection only, it is an exposed conductive part, and measures for fault protection are also applied.		N/A
8.5	**Incorporation of switching devices and components**		**N/A**
8.5.1	**Fixed parts**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	For fixed parts (see 3.2.1), the connections of the main circuits (see 3.1.3) is only connected or disconnected when the BTS is not under voltage.		N/A
	Removal and installation of fixed parts requires the use of a tool.		N/A
	The disconnection of a fixed part requires the isolation of the complete BTS or part of it.		N/A
	In order to prevent unauthorized operation, the switching device may be provided with means to secure it in one or more of its positions.		N/A
8.5.2	**Removable parts**		**N/A**
	The removable parts are so constructed that their electrical equipment can be safely isolated from or connected to the main circuit whilst this circuit is live. The removable parts may be provided with an insertion interlock (see 3.2.5).		N/A
	Removable parts have a connected position and a removed position		N/A
	A removable part may be fitted with a device, which ensures that it can only be removed and inserted after its main circuit has been switched off from the load.		N/A
8.5.3	**Selection of switching devices and components**		N/A
	Switching devices and components incorporated in BTS comply with the relevant IEC standards.		N/A
	The switching devices and components having a short-circuit withstand strength and/or a breaking capacity which is insufficient to withstand the stresses likely to occur at the place of installation, are protected by means of current-limiting protective devices, for example fuses or circuit-breakers.		N/A
	When selecting current-limiting protective devices for built-in switching devices, account is taken of the maximum permissible values specified by the device manufacturer, having due regard to co-ordination (see 9.3.4).		N/A
	Co-ordination of switching devices and components, for example co-ordination of motor starters with short-circuit protective devices, comply with the relevant IEC standards.		N/A
8.5.4	**Installation of switching devices and components**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Switching devices and components are installed and wired in the BTS in accordance with instructions provided by their manufacturer and in such a manner that their proper functioning is not impaired by interaction, such as heat, switching emissions, vibrations, electromagnetic fields, which are present in normal operation.		N/A
	In the case of electronic BTS, this may necessitate the separation or screening of all electronic signal processing circuits.		N/A
	When fuses are installed the original manufacturer states the type and rating of the fuselinks to be used.		N/A
8.5.6	**Barriers**		**N/A**
	Barriers for manual switching devices are so designed that the switching emissions do not present a danger to the operator.		N/A
	To minimize danger when replacing fuse-links, interphase barriers are applied, unless the design and location of the fuses makes this unnecessary.		N/A
8.5.7	**Direction of operation and indication of switching positions**		**N/A**
	The operational positions of components and devices are clearly identified. If the direction of operation is not in accordance with IEC 60447, then the direction of operation is clearly identified.		N/A
8.5.8	**Indicator lights and push-buttons**		**N/A**
	Unless otherwise specified in the relevant product standard the colours of indicator lights and push-buttons are in accordance with IEC 60073.		N/A
8.6	**Internal electrical circuits and connections**		**P**
8.6.1	**Main circuits**		**P**
	The busbars (bare or insulated) are arranged in such a manner that an internal short-circuit is not to be expected.		P
	They are rated at least in accordance with the information concerning the short-circuit withstand strength (see 9.3) and designed to withstand at least the short-circuit stresses limited by the protective device(s) on the supply side of the busbars.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Within one section, the conductors (including distribution busbars) between the main busbars and the supply side of functional units as well as the components included in these units may be rated on the basis of the reduced short-circuit stresses occurring on the load side of the respective short-circuit protective device within each unit, provided that these conductors are arranged so that under normal operation an internal short-circuit between phases and/or between phases and earth is not to be expected (see 8.6.4).		P
	Unless otherwise agreed between the BTS manufacturer and the user, the minimum cross-sectional area of the neutral within a three phase and neutral circuit is:		P
	For circuits with a phase conductor cross-sectional area up to and including 16 mm2, 100 % of that of the corresponding phases.		P
	For circuits with a phase conductor cross-sectional area above 16 mm², 50 % of that of the corresponding phases with a minimum of 16 mm2.		N/A
	It is assumed that the neutral currents do not exceed 50 % of the phase currents.		N/A
8.6.2	**Auxiliary circuits**		**N/A**
	The design of the auxiliary circuits takes into account the supply earthing system and ensures that an earth-fault or a fault between a live part and an exposed conductive part does not cause unintentional dangerous operation.		
	In general, auxiliary circuits are protected against the effects of short circuits.		N/A
	However, a short-circuit protective device is not provided if its operation is liable to cause a danger. In such a case, the conductors of auxiliary circuits are arranged in such a manner that a short-circuit is not to be expected (see 8.6.4).		N/A
8.6.3	**Bare and insulated conductors**		**P**
	The connections of current-carrying parts do not suffer undue alteration as a result of normal temperature rise, ageing of the insulating materials and vibrations occurring in normal operation.		P
	The effects of thermal expansion and of the electrolytic action in the case of dissimilar metals, and the effects of the endurance of the materials to the temperatures attained, are taken into consideration		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Connections between current-carrying parts are established by means that ensure a sufficient and durable contact pressure.		P
	If verification of temperature rise is carried out on the basis of tests (see 10.10.2) the selection of conductors and their cross-sections used inside the BTS is the responsibility of the BTS manufacturer.		P
	If verification of temperature rise is made following the rules of 10.10.3, the conductors have a minimum cross-section according to IEC 60364-5-52. Examples on how to adapt this standard for conditions inside an BTS are given in the tables included in Annex H.		P
	In the case of insulated solid or flexible conductors:		P
	– They are rated for at least the rated insulation voltage (see 5.2.3) of the circuit concerned.		P
	– Conductors connecting two termination points have no intermediate joint, e.g. spliced or soldered.		P
	– Conductors with only basic insulation are prevented from coming into contact with bare live parts at different potentials.		P
	– Contact of conductors with sharp edges are prevented.		P
	- Supply conductors to apparatus and measuring instruments in covers or doors are so installed that no mechanical damage can occur to the conductors as a result of movement of these covers or doors.		P
	– Soldered connections to apparatus are permitted in BTS only in cases where provision is made for this type of connection on the apparatus and the specified type of conductor is used.		N/A
	- For apparatus other than those mentioned above, soldering cable lugs or soldered ends of stranded conductors are not acceptable under conditions of heavy vibration. In locations where heavy vibrations exist during normal operation, for example in the case of dredger and crane operation, operation on board ships, lifting equipment and locomotives, attention is given to the support of conductors.		N/A
	– Generally only one conductor is connected to a terminal; the connection of two or more conductors to one terminal is permissible only in those cases where the terminals are designed for this purpose.		N/A
	The dimensioning of solid insulation between separate circuits are based on the circuit of highest rated insulation voltage.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
8.6.4	**Selection and installation of non-protected live conductors to reduce the possibility of short-circuits**		**N/A**
	Live conductors in an BTS that are not protected by short-circuit protective devices (see 8.6.1 and 8.6.2) are selected and installed throughout the entire BTS in such a manner that an internal short-circuit between phases or between phase and earth is a remote possibility. See Table 4.		N/A
	Non-protected live conductors selected and installed as in Table 4 and having a SCPD on the load side do not exceed 3 m in length.		N/A
8.6.5	**Identification of the conductors of main and auxiliary circuits**		N/A
	With the exception of the cases mentioned in 8.6.6, the method and the extent of identification of conductors, for example by arrangement, colours or symbols, on the terminals to which they are connected or on the end(s) of the conductors themselves, is the responsibility of the BTS manufacturer and is in agreement with the indications on the wiring diagrams and drawings.		N/A
	Where appropriate, identification according to IEC 60445 and IEC 60446 are applied		N/A
8.6.6	**Identification of the protective conductor (PE, PEN) and of the neutral conductor (N) of the main circuits**		**N/A**
	The protective conductor is readily distinguishable by location and/or marking or colour.		N/A
	If identification by colour is used, it is only green and yellow (twin-coloured), which is strictly reserved for the protective conductor.		N/A
	When the protective conductor is an insulated single-core cable, this colour identification is used, preferably throughout the whole length.		N/A
	Any neutral conductor of the main circuit is readily distinguishable by location and/or marking or colour. If identification by colour only is used, it is blue (see IEC 60446).		N/A
8.6.101	**Correct connection between BTS units**		**P**
	BTUs are designed as to ensure correct connection between the conductors of adjacent units forming a BTS (power circuits, auxiliary and communication circuits, PE…). This requirement may be achieved by proper identification of each connection.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	BTUs and tap-off units are designed as to ensure correct connection between their conductors (power circuits, auxiliary and communication circuits, PE…). This requirement is achieved by insertion interlocks (see 3.2.5 of Part 1).		N/A
8.7	**Cooling**		**N/A**
	BTS can be provided with both natural and forced cooling. If special precautions are required at the place of installation to ensure proper cooling, the BTS manufacturer furnishes the necessary information (for instance indication of the need for spacing with respect to parts that are liable to impede the dissipation of heat or produce heat themselves).		N/A
8.8	**Terminals for external conductors**		**P**
	The BTS manufacturer indicates whether the terminals are suitable for connection of copper or aluminium conductors, or both.		P
	The terminals are such that the external conductors may be connected by a means (screws, connectors, etc.) which ensures that the necessary contact pressure corresponding to the current rating and the short-circuit strength of the apparatus and the circuit is maintained.		P
	In the absence of a special agreement between the BTS manufacturer and the user, terminals are capable of accommodating copper conductors from the smallest to the largest cross-sectional areas corresponding to the appropriate rated current (see Annex A).		N/A
	Where aluminium conductors are to be terminated, the type, size and termination method of the conductors are as agreed between the BTS manufacturer and the user.		N/A
	In the case where external conductors for electronic circuits with low level currents and voltages (less than 1 A and less than 50 V a.c. or 120 V d.c.) have to be connected to an BTS, Table A.1 does not apply.		N/A
	The available wiring space permits proper connection of the external conductors of the indicated material and, in the case of multicore cables, spreading of the cores.		N/A
	The conductors are not subjected to stresses		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Unless otherwise agreed between the BTS manufacturer and the user, on three-phase and neutral circuits, terminals for the neutral conductor allow the connection of copper conductors having a current-carrying capacity:		N/A
	– equal to half the current-carrying capacity of the phase conductor, with a minimum of 16 mm^2, if the size of the phase conductor exceeds 16 mm^2;		N/A
	– equal to the full current-carrying capacity of the phase conductor, if the size of the latter is less than or equal to 16 mm^2.		N/A
	If connecting facilities for incoming and outgoing neutral, protective and PEN conductors are provided; they are arranged in the vicinity of the associated phase conductor terminals.		P
	Openings in cable entries, cover plates, etc., are so designed that, when the cables are properly installed, the stated protective measures against contact and degree of protection are obtained.		N/A
	The terminals for external protective conductors are marked according to IEC 60445.		P
	The terminals for external protective conductors (PE, PEN) and metal sheathing of connecting cables (steel conduit, lead sheath, etc.) are, where required, bare and, unless otherwise specified, suitable for the connection of copper conductors.		P
	A separate terminal of adequate size is provided for the outgoing protective conductor(s) of each circuit.		P
	Unless otherwise agreed between the BTS manufacturer and the user, terminals for protective conductors allow the connection of copper conductors having a cross-section depending on the cross-section of the corresponding phase conductors according to Table 5.		N/A
	In the case of enclosures and conductors of aluminium or aluminium alloys, particular consideration are given to the danger of electrolytic corrosion.		N/A
9	**PERFORMANCE REQUIREMENTS**		**P**
9.1	**Dielectric properties**		**P**
9.1.2	**Power-frequency withstand voltage**		**P**
	The circuits of the BTS are capable of withstanding the appropriate power frequency withstand voltages given in Tables 8 and 9. The rated insulation voltage of any circuit of the BTS is equal to or higher than its maximum operational voltage.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
9.1.3	**Impulse withstand voltage**		**P**
9.1.3.1	**Impulse withstand voltages of main circuits**		**P**
	Clearances from live parts to parts intended to be earthed and between poles are capable of withstanding the test voltage given in Table 10 appropriate to the rated impulse withstand voltage.		P
	The rated impulse withstand voltage for a given rated operational voltage is not be less than that corresponding in Annex G to the nominal voltage of the supply system of the circuit at the point where the BTS is to be used and the appropriate overvoltage category.		P
9.1.3.2	**Impulse withstand voltages of auxiliary circuits**		**N/A**
	a) Auxiliary circuits that are connected to the main circuit and operate at the rated operational voltage without any means for reduction of overvoltage comply with the requirements of 9.1.3.1.		N/A
	b) Auxiliary circuits that are not connected to the main circuit may have an overvoltage withstand capacity different from that of the main circuit. The clearances of such circuits – a.c. or d.c. – are capable of withstanding the appropriate impulse withstand voltage in accordance with Annex G.		N/A
9.1.4	**Protection of surge protective devices**		**P**
	When overvoltage conditions require surge protective devices (SPD's) to be connected to the main busbars, such SPD's are protected to prevent uncontrolled short-circuit conditions as specified by the SPD manufacturer.		P
9.2	**Temperature rise limits**		**P**
	The temperature-rise limits given in Table 6 apply for mean ambient air temperatures less than or equal to 35 °C and are not exceeded for BTS when verified in accordance with 10.10.		P
	The temperature rise of an element or part is the difference between the temperature of this element or part measured in accordance with 10.10.2.3.3 and the ambient air temperature outside the BTS.		P
	The temperature rises obtained during the test do not cause damage to current-carrying parts or adjacent parts of the BTS. In particular, for insulating materials, the BTS Manufacturer demonstrates compliance either by reference to the insulation temperature index (determined for example by the methods of IEC 60216) or by compliance with IEC 60085.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
9.3	**Short-circuit protection and short-circuit withstand strength**		**P**
	BTS are capable of withstanding the thermal and dynamic stresses resulting from short-circuit currents not exceeding the rated values.		P
	BTS are protected against short-circuit currents by means of, for example, circuit breakers, fuses or combinations of both, which may either be incorporated in the BTS or arranged outside it.		P
9.3.2	**Information concerning short-circuit withstand strength**		**P**
	For BTS with a short-circuit protective device (SCPD) incorporated in the incoming unit, the BTS manufacturer indicates the maximum allowable value of prospective short-circuit current at the input terminals of the BTS.		P
	This value does not exceed the appropriate rating(s) (see 5.3.4, 5.3.5 and 5.3.6). The corresponding power factor and peak values are those shown in 9.3.3.		P
	If a circuit breaker with time-delay release is used as the short-circuit protective device, the BTS manufacturer states the maximum time-delay and the current setting corresponding to the indicated prospective short-circuit current.		P
	For BTS where the short-circuit protective device is not incorporated in the incoming unit, the BTS manufacturer indicates the short-circuit withstand strength in one or more of the following ways:		P
	a) rated short-time withstand current (Icw) together with the associated duration (see 5.3.5) and rated peak withstand current (Ipk) ((see 5.3.4);		P
	b) rated conditional short-circuit current (Icc) (see 5.3.6).		P
	For times up to a maximum of 3 s, the relationship between the rated short-timer current and the associated duration is given by the formula I2t = constant , provided that the peak value does not exceed the rated peak withstand current.		N/A
	The BTS manufacturer indicates the characteristics of the short-circuit protective devices necessary for the protection of the BTS.		P
	For an BTS having several incoming units which are unlikely to be in operation simultaneously, the short-circuit withstand strength can be indicated for each of the incoming units in accordance with the above.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	For an BTS having several incoming units which are likely to be in operation simultaneously, and for an BTS having one incoming unit and one or more outgoing high-power units likely to contribute to the short-circuit current, it is necessary to determine the values of the prospective short-circuit current in each incoming unit, in each outgoing unit and in the busbars based on data provided by the user.		N/A
9.3.3	**Relationship between peak current and short-time current**		**P**
	For determining the electrodynamic stresses, the value of peak current is obtained by multiplying the r.m.s.value of the short-circuit current by the factor n. The values for the factor n and the corresponding power factor are given in Table 7.		P
9.3.4	**Co-ordination of protective devices**		**P**
	The co-ordination of protective devices within the BTS with those to be used external to the BTS are the subject of an agreement between the BTS manufacturer and the user. Information given in the BTS manufacturer's catalogue may take the place of such an agreement.		P
	If the operating conditions require maximum continuity of supply, the settings or selection of the short-circuit protective devices within the BTS are, where possible, so coordinated that a short circuit occurring in any outgoing circuit is cleared by the switching device installed in the circuit without affecting the other outgoing circuits, thus ensuring selectivity of the protective system.		P
	Where short-circuit protective devices are connected in series and are intended to operate simultaneously to reach the required short-circuit switching capability (i.e. back-up protection), the BTS Manufacturer informs the User (e.g. by a warning label in the BTS or in the operating instructions, see 6.2) that none of the protective devices are allowed to be replaced by another device which is not of identical type and rating, since the switching capability of the whole combination may otherwise be compromised.		P
9.4	**Electromagnetic compatibility (EMC)**		**N/A**
	For EMC related performance requirements, see J.9.4 of Annex J.		N/A
9.101	**Resistance to flame propagation**		**P**
	A non-flame-propagating BTS either does not ignite or, if ignited, does not continue to burn when the source of ignition is removed.		P
9.102	**Fire resistance in building penetration**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	A fire barrier BTU, if any, is designed to prevent the propagation of fire, for a specified time, under fire conditions, where the BTS passes through horizontal or vertical building divisions (for example, wall or floor).		N/A
10	**DESIGN VERIFICATION**		**P**
	Design verification is intended to verify compliance of the design of an BTS with the requirements of this series of standards.		-
	The tests is performed on a representative sample of an BTS in a clean and new condition.		P
	Where tests on the BTS have been conducted in accordance with IEC 60439-2, and the test results fulfil the requirements of this Part 6 of IEC 61439, the verification of these requirements need not be repeated.		N/A
	Repetition of verifications in the product standards of switching devices or components incorporated in the BTS, which have been selected in accordance with 8.5.3 and installed in accordance with the instructions of their manufacturer is not required.		P
	Tests on individual devices to their respective product standards are not an alternative to the design verifications in this standard for the BTS.		-
	Design verification is achieved by the application of one or more of the following equivalent and alternative methods as appropriate: testing, calculation, physical measurement or the validation of design rules.		P
	The performance of the BTS may be affected by the verification tests (e.g. short-circuit test). These tests are not performed on an BTS that is intended to be placed in service.		-
	An BTS which is verified in accordance with this standard by an original manufacturer (see 3.10.1) and manufactured or assembled by another does not require the original design verifications to be repeated if all the requirements and instructions specified and provided by the Original Manufacturer are met in full.		P
	Where the BTS manufacturer incorporates their own arrangements not included in the original manufacturer's verification, the BTS manufacturer is deemed to be the original manufacturer in respect of these arrangements.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The number of BTS or parts thereof used for verification and the order in which the verification is carried out is at the discretion of the original manufacturer.		N/A
	The data used, calculations made and comparison undertaken for the verification of BTS are recorded in a verification report.		N/A
10.2	**STRENGTH OF MATERIALS AND PARTS**		**P**
10.2.1	**General**		**P**
	The mechanical, electrical and thermal capability of constructional materials and parts of the BTS are deemed to be proven by verification of construction and performance characteristics.		P
	Where an empty enclosure in accordance with IEC 62208 is used, and it has not been modified so as to degrade the performance of the enclosure, no repetition of the enclosure testing to 10.2 is required.		N/A
10.2.2	**Resistance to corrosion**		P
	The resistance to corrosion of representative samples of ferrous metallic enclosures and internal and external ferrous metallic parts of the BTS are verified.		-
	The test are carried out on an enclosure or representative sample showing the same constructional detail as the enclosure itself.		P
	In all cases hinges, locks and fastenings are also tested unless they have previously been subjected to an equivalent test and their resistance to corrosion has not been compromised by their application.		N/A
	Where the enclosure is subjected to the test it is mounted as for normal use according to the original manufacturer's instructions.		P
	The test specimens is new and in a clean condition and is subjected to severity test A or B, as detailed in 10.2.2.2 and 10.2.2.3.		P
10.2.2.4	**Results to be obtained**		**P**
	After the test, the enclosure or samples are washed in running tap water for 5 min, rinsed in distilled or demineralized water then shaken or subjected to air blast to remove water droplets. The specimen under test is then stored under normal service conditions for 2 h.		
	Compliance is checked by visual inspection to determine that:		-

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	– there is no evidence of iron oxide, cracking or other deterioration more than that allowed by ISO 4628-3 for a degree of rusting Ri1. However surface deterioration of the protective coating is allowed. In case of doubt associated with paints and varnishes, reference is made to ISO 4628-3 to verify that the samples conform to the specimen Ri1;		P
	– the mechanical integrity is not impaired;		P
	– seals are not damaged,		P
	– doors, hinges, locks, and fastenings work without abnormal effort.		P
10.2.3	**Properties of insulating materials**		**P**
10.2.3.1	**Verification of thermal stability of enclosures**		**P**
	The thermal stability of enclosures manufactured from insulated material is verified by the dry heat test. The test is carried out according to IEC 60068-2-2 Test Bb, at a temperature of 70 °C, with natural air circulation, for a duration of 168 h and with a recovery of 96 h.		P
	Parts, intended for decorative purposes that have no technical significance are not considered for the purpose of this test.		P
	The enclosure, mounted as for normal use, is subjected to a test in a heating cabinet with an atmosphere having the composition and pressure of the ambient air and ventilated by natural circulation. If the dimensions of the enclosure are inconsistent with those of the heating cabinet, the test may be carried out on a representative sample of the enclosure.		P
	The use of an electrically heated cabinet is recommended.		P
	The enclosure or sample shows no crack visible to normal or corrected vision without additional magnification nor does the material have become sticky or greasy, this being judged as follows:		P
	With the forefinger wrapped in a dry piece of rough cloth, the sample is pressed with a force of 5 N.		P
	No traces of the cloth remains on the sample and the material of the enclosure or sample does not stick to the cloth.		P
10.2.3.2	**Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The glow-wire test principles of IEC 60695-2-10 and the details given in IEC 60695-2-11 are used to verify the suitability of materials used:		-
	a) on parts of BTS, or		N/A
	b) on parts taken from these parts.		P
	The test is carried out on material with the minimum thickness used for the parts in a) or b).		P
	As an alternative the original manufacturer provides data on the suitability of materials from the insulating material supplier to demonstrate compliance with the requirements of 8.1.5.3.		N/A
	The temperature of the tip of the glow-wire is as follows:		-
	– 960 °C for parts necessary to retain current-carrying parts in position;		P
	- 850 °C for enclosures intended for mounting in hollow walls;		N/A
	– 650 °C for all other parts, including parts necessary to retain the protective conductor.		N/A
	The specimen is considered to have withstood the glow-wire test if		-
	– there is no visible flame and no sustained glowing, or if		P
	– flames and glowing of the specimen extinguish within 30 s after removal of the glow-wire.		N/A
	There is no burning of the tissue paper or scorching of the pinewood board.		P
10.2.4	**Resistance to ultra-violet (UV) radiation**		**N/A**
	This test applies only to enclosures and external parts of BTS intended to be installed outdoors and which are constructed of synthetic materials or metals that are entirely coated by synthetic material. Representative samples of such parts are subjected to the test		N/A
	UV test according to ISO 4892-2 method A; 1 000 cycles of 5 min of watering and 25 min of dry period with xenon lamp providing a total test period of 500 h.		N/A
	The values of temperature and humidity used for the test are (65 ± 3) °C and (65 ± 5) % respectively, unless declared otherwise by the original manufacturer.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	For enclosures constructed of synthetic materials compliance is checked by verification that the flexural strength (according to ISO 178) and Charpy impact (according to ISO 179) of synthetic materials have 70 % minimum retention.		N/A
	For the test carried out in accordance with ISO 178, the surface of the sample exposed to UV is turned face down and the pressure applied to the non-exposed surface.		N/A
	For the test carried out in accordance with ISO 179 no grooves are cut into the sample and the impact is applied to the exposed surface.		N/A
	After the test, samples are subjected to the glow-wire test of 10.2.3.3.		N/A
	For compliance, enclosures constructed of metals entirely coated by synthetic material, the adherence of the synthetic material (according to ISO 2409) have 50 % minimum retention.		N/A
	Samples show no cracks or deterioration visible to normal or corrected vision without additional magnification.		N/A
	This test need not be carried out if the original manufacturer can provide data from the synthetic material supplier to demonstrate that materials of the same thickness or thinner comply with this requirement.		N/A
10.2.5	**Lifting**		**P**
	The maximum number of sections allowed by the original manufacturer to be lifted together are equipped with components and/or weights to achieve a weight of 1,25 times its maximum shipping weight.		P
	With doors closed it is lifted with the specified lifting means and in the manner defined by the original manufacturer.		P
	From a standstill position, the BTS is raised smoothly without jerking in a vertical plane to a height of (1 ± 0,1) m and lowered in the same manner to a standstill position. This test is repeated a further two times after which the BTS is raised up and suspended for 30 min at a height of (1 ± 0,1) m without any movement.		P
	Following this test the BTS is raised smoothly without jerking from a standstill position to a height of (1 ± 0,1) m and moved (10 ± 0,5) m horizontally, then lowered to a standstill position. This sequence, is carried out three times at uniform speed, each sequence being carried out within 1 min.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	During the test, with the test weights in place, the BTS shows no deflections and after the test show no cracks or permanent distortions visible to normal or corrected vision without additional magnification, which could impair any of its characteristics.		P
10.2.6	**Mechanical impact**		**N/A**
	Mechanical impact tests where required by the specific BTS standard are to be carried out in accordance with IEC 62262.		N/A
10.2.7	**Marking**		**P**
	Marking made by moulding, pressing, engraving or similar is not submitted to the following test.		P
	The test is made by rubbing the marking by hand for 15 s with a piece of cloth soaked in water and then for 15 s with a piece of cloth soaked with petroleum spirit.		P
	After the test the marking is legible to normal or corrected vision without additional magnification.		P
10.2.101	**Ability to withstand mechanical loads**		**P**
10.2.101.1	**Test procedure for a straight busbar trunking unit**		**P**
	The first test shall be made on one straight BTU supported as in normal use at two positions spaced at the maximum distance D specified by the original manufacturer. The location and form of the supports shall be specified by the original manufacturer.	D = 20mm	P
	Mass m is the mass of the BTU between the supports. m_L is the mass of the feeder and tap-off units specified by the original manufacturer to be connected to the length D.	m = 0,5 kg m_L = 1 kg	P
	A mass m shall be placed without dynamic loading on a square rigid piece with sides equal to the width of the BTU, at the midpoint between the supports on top of the enclosure. m + m_L for normal loads m + m_L + 90 kg for heavy loads	m + m_L = kg m + m_L + 90 = … kg	N/A
	The duration of the test is at least 5 min.	t = 5min	P
10.2.101.2	**Test procedure for a joint**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	A second test shall be made on two BTUs joined together and supported as in normal use at the minimum number of positions at the distances D and D_1. The distance D is that specified in 10.2.101.1; the distance D_1 is the maximum distance between supports adjacent to a joint as specified by the original manufacturer. The joint shall be placed midway between the supports.	D_1 =10mm	P
	Mass m_1 is the mass of those parts of the BTUs, including the joint, between the supports located at distance D_1. m_{L1} is the maximum mass of the feeder and tap-off units specified by the original manufacturer to be connected to the length D_1.	m_1 = 1 kg m_{L1} = 2kg	P
	A mass M1 shall be placed without dynamic loading on top of the enclosure at the joint on a square rigid piece with sides equal to the width of the BTU. $m_1 + m_{L1}$ for normal loads $m_1 + m_{L1}$ + 90 kg for heavy loads	$m_1 + m_{L1}$ = kg $m_1 + m_{L1}$ + 90 = … kg	N/A
	The duration of the test is at least 5 min.	t = 5 min	P
10.2.101.3	**Resistance of the enclosure to crushing**		**N/A**
	A straight BTU shall be subjected to a crushing force, successively at four or more points, including one point between adjacent insulators, if any.		N/A
	The BTU support horizontally on a flat surface and the force shall be applied through a rigid plate equal to the width of the BTU and 120 mm long.		N/A
	The crushing force shall at least be equal to 4 times the weight of 1 m length, for BTS stated for normal mechanical loads; a mass of 90 kg shall be added for BTS stated for heavy mechanical loads.	kg	N/A
	The duration of the test is at least 5 min.	t = min	N/A
10.2.101.4	**Results to be obtained**		**P**
	During and after the tests according to 10.2.101.1 to 10.2.101.3, there are neither break, nor permanent deformation of the enclosure which would compromise the degree of protection, reduce the clearances and creepage distances to values lower than those specified in 8.3, or impair the correct insertion of incoming and outgoing units.		P
10.2.102	**Thermal cycling test**		**P**
10.2.102.1	**General**		P
	Plug-in tap-off units shall be submitted to a thermal cycling test.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
10.2.102.2	**Test sample**		P
	a test on one combination of a BTU and a tap-off unit is considered to be representative of the range. The design of the plug assembly includes the physical characteristics and the material and surface finish (e.g. plating), if applicable.		P
	A tap-off unit incorporating fuses shall be fitted with the maximum size of fuses specified by the original manufacturer. A tap-off unit incorporating a circuit-breaker shall be fitted with a circuit-breaker of the maximum rating specified by the original manufacturer.		N/A
	The tap-off unit shall be arranged and loaded as in 10.10.2.3.6.		N/A
10.2.102.3	**Test produce**		P
	The current is applied until the temperatures have stabilised. The temperatures as specified for the temperature-rise test are recorded. Both currents are switched off and the sample is allowed to return to room temperature.		P
	The sample is then subjected to 84 cycles consisting of a) 3 h ON at rated current and 3 h OFF, or b) 2 h ON at rated current and 2 h OFF, if the temperatures taken at the end of the initial 2 h ON period are within 5 K of the temperatures recorded at the end of the stabilisation run.	a) or b)	P
10.2.102.4	**Results to be obtained**		P
	The temperatures taken after the 84th cycle shall not be more than 5 K higher than the temperatures recorded at the end of the stabilisation run.		P
10.3	**DEGREE OF PROTECTION OF PCS-BTS**		**P**
	The degree of protection provided is verified in accordance with IEC 60529; the test may be carried out on a representative equipped BTS.	IP20, after installation	P
	Where an empty enclosure in accordance with IEC 62208 is used, and no external modification has been carried out that may result in a deterioration of the degree of protection, no further testing is required		N/A
	BTS having a degree of protection of IP 5X are tested according to category 2 in 13.4 of IEC 60529.		N/A
	BTS having a degree of protection of IP 6X are tested according to category 1 in 13.4 of IEC 60529.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The test device for IP X3 and IP X4 as well as the type of support for the enclosure during the IP X4 test is stated in the test report.		N/A
	The IP X1 to IP X6 tests on an BTS are deemed to be a failure if any water comes into contact with electrical equipment housed within the enclosure. Ingress of water is permissible only if its route of entry is obvious and the water is only in contact with the enclosure at a location where it will not impair safety.		N/A
	When traces of water could raise doubts as to the correct functioning and safety of equipment, a dielectric test according to 10.9.2 of Part 1 shall be carried out.		N/A
10.4	**CLEARANCES AND CREEPAGE DISTANCES**		**P**
	The clearances are sufficient to enable the declared rated impulse withstand voltage (Uimp) of a circuit to be achieved. Rated impulse withstands voltage. ..... :	4,0kV	P
	Required clearances as specified in Table 1. ..... :	3,0mm (between P-P)	P
	Measured clearances ..... :	3,13mm (between P-P)	P
	The original manufacturer selects a rated insulation voltage(s) (Ui) for the circuits of the BTS from which the creepage distance(s) is determined. For any given circuit the rated insulation voltage is not less than the rated operational voltage (Ue). Insulation voltage Ui..... :	400V	P
	Pollution degree. ..... :	3	P
	Material group . ..... :	IIIa	P
	Minimum clearances required ..... :	6,3mm	P
	The creepage distances measured..... :	6,9mm	P
	Where functional units are mounted on withdrawable parts, the isolation provided in the isolated position is at least comply with the requirements in the relevant specification for disconnectors (see IEC 60947-3).		N/A
	The isolating distance between the withdrawable unit main contacts and their associated fixed contacts in the isolated position is capable of withstanding the test voltage for the declared impulse withstand voltage as specified in Table 102.		N/A
10.5	**PROTECTION AGAINST ELECTRIC SHOCK AND INTEGRITY OF PROTECTIVE CIRCUITS**		**P**
10.5.2	**Effective earth continuity between the exposed conductive parts of the BTS and the protective circuit**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	It is verified that the different exposed conductive parts of the BTS are effectively connected to the terminal for the incoming external protective conductor and that the resistance of the circuit does not exceed 0,1 Ω		N/A
	Verification is made using a resistance measuring instrument which is capable of driving a current of at least 10 A (a.c. or d.c.).		N/A
	The current is passed between each exposed conductive part and the terminal for the external protective conductor. The resistance does not exceed 0,1 Ω		N/A
10.5.3	**Short-circuit withstand strength of the protective circuit**		**N/A**
	The short-circuit withstand strength specified by the original manufacturer is verified.		N/A
	The original manufacturer determines the reference design(s) that will be used in 10.5.3.3 and 10.5.3.4.	See annex	N/A
10.5.3.2	**Protective circuits that are exempted from short-circuit withstand verification**		**P**
	Where a separate protective conductor is provided in accordance with 8.4.3.2.3, short-circuit testing is not required if one of the conditions of 10.11.2. is fulfilled.		P
10.5.3.3	**Verification by comparison with a reference design – Utilising a check list**		**N/A**
	Verification is achieved when comparison of the BTS to be verified with an already tested design meets all the following requirements:		N/A
	a) items 1 to 3, 5 to 6, and 8 to 10 of the check list in Table 13 of Part 1;		N/A
	b) the busbar supports of each circuit of the BTS to be assessed are of the same type, shape and material, and have the same or smaller spacing along the length of the busbar as the reference design; and insulation materials are of the same type, shape and thickness.		N/A
	To ensure the same current carrying capacity for that portion of the fault current that flows through the exposed conductive parts, the design, number and arrangement of the parts that provide contact between the protective conductor and the exposed conductive parts, shall be the same as in the tested reference design.		N/A
10.5.3.5	**Verification by test**		P
	Subclause 10.11.5.6 applies.		**P**
10.6	**INCORPORATION OF SWITCHING DEVICES AND COMPONENTS**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance with the design requirements of 8.5 for the incorporation of switching devices and components is confirmed by inspection and verified to the requirements of this standard.		N/A
10.6.2	**Electromagnetic compatibility**		**N/A**
	The performance requirements of J.9.4 for electromagnetic compatibility is confirmed by inspection or where necessary by test (see J.10.12).		N/A
10.7	**INTERNAL ELECTRICAL CIRCUITS AND CONNECTIONS**		**N/A**
	Compliance with the design requirements of 8.6 for internal electrical circuits and connections is confirmed by inspection and verified to this standard.		N/A
10.8	**TERMINALS FOR EXTERNAL CONDUCTORS**		**N/A**
	Compliance with the design requirements of 8.8 for terminals for external conductors is confirmed by inspection.		N/A
10.9	**DIELECTRIC PROPERTIES**		**P**
10.9.1	**General**		**P**
	For this test, all the electrical equipment of the BTS is connected, except those items of apparatus which, according to the relevant specifications, are designed for a lower test voltage; current-consuming apparatus (e.g. windings, measuring instruments, voltage surge suppression devices) in which the application of the test voltage would cause the flow of a current, are disconnected.		P
	Such apparatus are disconnected at one of their terminals unless they are not designed to withstand the full test voltage, in which case all terminals may be disconnected.		P
10.9.2	**Power-frequency withstand voltage**		**P**
10.9.2.1	**Main, auxiliary and control circuits**		**P**
	Main, auxiliary and control circuits that are connected to the main circuit are subjected to the test voltage according to Table 8.		P
	Auxiliary and control circuits, whether a.c. or d.c., that are not connected to the main circuit are subjected to the test voltage according to Table 9.		N/A
10.9.2.2	**Test voltage**		**P**
	The test voltage has a practically sinusoidal waveform and a frequency between 45 Hz and 65 Hz.	1890V, 50Hz	P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The high-voltage transformer used for the test is so designed that, when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current is at least 200 mA.		P
	The overcurrent relay does not trip when the output current is less than 100 mA.		P
	The value of the test voltage is that specified in Table 8 or 9 as appropriate with a permitted tolerance of ± 3 %.		P
10.9.2.3	**Application of the test voltage**		**P**
	The power frequency voltage at the moment of application does not exceed 50 % of the full test value. It is then be increased progressively to this full value and maintained for 5 s as follows:	5s	P
	a) between all the poles of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the earthed enclosure, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		P
	b) between each pole of the main circuit and, the other poles and the earthed enclosure connected together, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		P
	c) between each control and auxiliary circuit not normally connected to the main circuit and the – main circuit; – other circuits; – exposed conductive parts including the earthed enclosure.		N/A
	The overcurrent relay does not operate and there are no disruptive discharge (see 3.6.18) during the tests.		P
10.9.3	**Impulse withstand voltage**		**P**
10.9.3.1	**General**		**-**
	Verification is made by test or by the validation of application of design rules.		P
	In place of the impulse withstand voltage test the original manufacturer may perform, at his discretion, an equivalent a.c. or d.c. voltage test, in accordance with 10.9.3.3 or 10.9.3.4, but consideration is given to the fact that such a tests exert a higher stress.		P
10.9.3.2	**Impulse withstand voltage test**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The impulse voltage generator is adjusted to the required impulse voltage with the BTS connected. The value of the test voltage is that specified in 9.1.3. The accuracy of the applied peak voltage is ± 3 %.		P
	Impulse withstand voltage (Uimp) ..... :	4,0kV	P
	Auxiliary circuits not connected to main circuits are connected to earth.		N/A
	The 1,2/50 µs impulse voltage is applied to the BTS five times for each polarity at intervals of 1 s minimum as follows:		P
	a) between all the poles of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the earthed enclosure, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		P
	b) between each pole of the main circuit and, the other poles and the earthed enclosure connected together, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link.		P
	For an acceptable result there are no unintentional disruptive discharge during the tests.		P
	The impulse withstand voltage capability of the isolating distance between the withdrawable units' main contacts and their associated fixed contacts are verified to confirm compliance with 8.3.2.		P
10.9.3.3	**Alternative power-frequency voltage test**		**N/A**
	The test voltage has a practically sinusoidal waveform and a frequency between 45 Hz and 65 Hz.		N/A
	The overcurrent relay does not trip when the output current is less than 100 mA.		N/A
	The value of the test voltage is that specified in 9.1.3 and Table 10 as appropriate with a permitted tolerance of ± 3 %.		N/A
	Power-frequency ..... :		N/A
	The power-frequency voltage is applied once, at full value, for a duration sufficient for the magnitude to be ascertained, but it is not less than 15 ms or greater than 100 ms.		N/A
	It is applied:		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	a) between all the poles of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the earthed enclosure, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		N/A
	b) between each pole of the main circuit and, the other poles and the earthed enclosure connected together, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		N/A
	c) between each control and auxiliary circuit not normally connected to the main circuit and the – main circuit; – other circuits; – exposed conductive parts including the earthed enclosure.		N/A
	For an acceptable result the overcurrent relay does not operate and there is no disruptive discharge during the tests.		N/A
10.9.3.4	**Alternative d.c. voltage test**		**N/A**
	The test voltage has negligible ripple.		N/A
	The high-voltage source used for the test is so designed that, when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current is at least 200 mA.		N/A
	The overcurrent relay does not trip when the output current is less than 100 mA.		N/A
	The value of the test voltage is that specified in 9.1.3 and Table 10 as appropriate with a permitted tolerance of ± 3 %.		N/A
	Alternative d.c. voltage ..... :		N/A
	The d.c. voltage is applied once for each polarity for a duration sufficient for the magnitude to be ascertained, but it isl not less than 15 ms or greater than 100 ms.		N/A
	It is applied:		N/A
	a) between all the poles of the main circuit connected together (including the control and auxiliary circuits connected to the main circuit) and the earthed enclosure, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	b) between each pole of the main circuit and, the other poles and the earthed enclosure connected together, with the main contacts of all switching devices in the closed position or bridged by a suitable low resistance link;		N/A
	c) between each control and auxiliary circuit not normally connected to the main circuit and the – main circuit; – other circuits; – exposed conductive parts including the earthed enclosure.		N/A
	For an acceptable result the overcurrent relay does not operate and there is no disruptive discharge during the tests.		N/A
10.9.3.5	**Verification assessment**		**N/A**
	The clearances are at least 1,5 times the values specified in Table 1.		N/A
	Clearances are verified by measurement, or verification of measurements on design drawings, employing the measurement methods stated in Annex F.		N/A
	It is verified by assessment of the device manufacturer's data that all incorporated devices are suitable for the specified rated impulse withstand voltage (Uimp).		N/A
10.9.4	**Testing of enclosures made of insulating material**		**P**
	For BTS with enclosures made of insulating material, an additional dielectric test is carried out by applying an a.c. test voltage between a metal foil laid on the outside of the enclosure over openings and joints, and the interconnected live and exposed conductive parts within the BTS located next to the openings and joints.		P
	For this additional test, the test voltage is equal to 1,5 times the values indicated in Table 8.	1,5*1890V=2835V	P
10.9.5	**External operating handles of insulating material**		**N/A**
	In the case of handles made of or covered by insulating material, a dielectric test is carried out by applying a test voltage equal to 1,5 times the test voltage indicated in Table 8 between the live parts and a metal foil wrapped round the whole surface of the handle. During this test, the exposed conductive parts are not earthed or connected to any other circuit.		N/A
10.10	**VERIFICATION OF TEMPERATURE RISE**		**P**
10.10.1	**General**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	It shall be verified that the temperature-rise limits specified in 9.2 for the different parts of the BTS will not be exceeded.		P
	Verification is made by one or more of the following methods:		P
	a) testing (10.10.2);		P
	b) derivation (from a tested design) of ratings for similar variants (10.10.3);		P
10.10.2	**Verification by testing**		**P**
10.10.2.1	**General**		**P**
	Verification by test shall comprise the following:		P
	a) if the BTS to be verified comprises a number of variants, selection of the most onerous one(s) according to 10.10.2.2:	With 4P/3P+N	P
	b) verification of the selected variant(s), according to 10.10.2.3.		N/A
10.10.2.2	**Selection of the representative arrangements**		**P**
10.10.2.2.1	**General**		**P**
	The test shall be made on representative BTUs and tap-off units, respectively selected according to 10.10.2.2.2 and 10.10.2.2.3.		P
	3-phase/3-wire BTUs and tap-off units shall respectively be considered as representative of 3-phase/4-wire, 3-phase/5-wire and single-phase/2-wire or single-phase/3-wire BTUs and tapoff units, provided that the neutral conductor is sized equal to or greater than the phase conductors and arranged in the same manner.		P
	The selection is the responsibility of the original manufacturer.		P
	The original manufacturer should take into consideration the other arrangements the rated currents of which are to be derived according to 10.10.3 from the tested arrangements.		P
10.10.2.2.2	**Busbar trunking units**		**P**
	a) Identification of similar BTUs		N/A
	b) Selection of a representative BTU		P
10.10.2.2.3	**Tap-off units**		**N/A**
	a) Identification of similar tap-off units		**N/A**
	Tap-off units can be considered as similar variants of a same design, even if they are intended for different rated currents, if they fulfil all the following conditions:		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	i) the function of the main circuit is the same (e.g. cable feeder, motor starter);		N/A
	ii) the devices are of the same frame size and belong to the same series;		N/A
	iii) the mounting structure and enclosure of the tap-off unit are of the same type;		N/A
	iv) the mutual arrangement of the device(s) is the same;		N/A
	v) the type and arrangement of conductors, including the type of connection and conductor material between tap-off unit and BTU are the same;		N/A
	vi) the cross-section of the main circuit conductors has a rating at least equal to that of the lowest rated device in series in the main circuit. Selection of conductors shall be as tested or in accordance with IEC 60364-5-52. Examples on how to adapt this standard for conditions inside a tap-off unit are given in Annex H of Part 1. The cross-section of bars shall be as tested or as given in Annex N of Part 1.		N/A
	b) Selection of a representative tap-off unit		**N/A**
	The maximum possible current rating for each variant of tap-off unit is established. For tap-off units containing only one device, this is the rated current of the device. For tap-off units with several devices in series in the main circuit, it is that of the device with the lowest rated current.		N/A
	For each tap-off unit the power loss is calculated at the maximum possible current using the data peculiar to each device (including devices in auxiliary circuits) together with the power losses of the associated conductors in main circuits.		N/A
	A representative variant out of the similar variants shall fulfil all the following requirements:		N/A
	i) the lowest specific conductance of main circuit conductors,		N/A
	ii) the highest total power loss,		N/A
	iii) the most onerous enclosure (overall dimensions, partitions and ventilation).		N/A
	Where all requirements cannot be met with a single tap-off unit, further testing shall be carried out.		N/A
	The original manufacturer should determine whether additional testing, in the other orientation than the reference orientation, is necessary.		N/A
10.10.2.3	**Methods of test**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
10.10.2.3.1	**General**		**P**
	The temperature-rise test on the individual circuits shall be made at their rated frequency.	50Hz	P
	To produce the desired current any convenient value of the test voltage may be used.		P
	The test currents shall be adjusted to be substantially equal in all phase conductors. Any unintentional circulation of air into the BT run under test shall be prevented (for example, by closing the ends of the enclosure).		P
	If the tap-off unit includes fuses, these shall be fitted for the test with fuse-links as specified by the original manufacturer. The power losses of the fuse-links used for the test shall be stated in the test report. Fuse-link power loss may be determined by measurement or alternatively as declared by the fuse-link manufacturer.		N/A
	In tap-off units where additional control circuits or devices can be incorporated, heating resistors shall simulate the power dissipation of these additional items.		N/A
	When a control electro-magnet is energized during the test, the temperature shall be measured when thermal equilibrium is reached in both the main circuit and the control electromagnet.		N/A
	The size and disposition of external conductors used for the test shall be stated in the test report.		N/A
	The test shall be made for a time sufficient for the temperature rise to reach a constant value.		P
	In practice, this condition is reached when the variation at all measured points (including the ambient air temperature) does not exceed 1 K/h.		P
	To shorten the test, if the devices allow it, the current may be increased during the first part of the test, it being reduced to the specified test current afterwards.		P
10.10.2.3.2	**Test conductors**		**P**
	In the absence of detailed information concerning the external conductors and the service conditions, the cross-section of the external test conductors are in accordance with the following.		P
	1) **For values of rated current up to and including 400 A:**		**P**
	a) the conductors are single-core, copper cables or insulated wires with cross-sectional areas as given in Table 11;		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	b) as far as practicable, the conductors are in free air;		P
	c) the minimum length of each temporary connection from terminal to terminal is: – 1 m for cross-sections up to and including 35 mm2; – 2 m for cross-sections larger than 35 mm2.		P
	2) **For values of rated current higher than 400 A but not exceeding 800 A:**		**N/A**
	a) The conductors are single-core copper cables with cross-sectional areas as given in Table 12, or the equivalent copper bars given in Table 12 as specified by the original manufacturer.		N/A
	b) Cables or copper bars are spaced at approximately the distance between terminals. Multiple parallel cables per terminal are bunched together and arranged with approximately 10 mm air space between each other. Multiple copper bars per terminal are spaced at a distance approximately equal to the bar thickness. If the sizes stated for the bars are not suitable for the terminals or are not available, it is allowed to use other bars having the same cross-sectional dimensions 10 % and the same or smaller cooling surfaces. Cables or copper bars are not interleaved.		N/A
	c) For single-phase or multi-phase tests, the minimum length of any temporary connection to the test supply is 2 m. The minimum length to a star point may be reduced to 1,2 m where agreed by the original manufacturer.		N/A
	3) **For values of rated current higher than 800 A but not exceeding 4000 A:**		**N/A**
	a) The conductors are copper bars of the sizes stated in Table 12 unless the BTS is designed only for cable connection. In this case, the size and arrangement of the cables are as specified by the original manufacturer.		N/A
	b) Copper bars are spaced at approximately the distance between terminals. Multiple copper bars per terminal are spaced at a distance approximately equal to the bar thickness. If the sizes stated for the bars are not suitable for the terminals or are not available, it is allowed to use other bars having the same cross-sectional dimensions 10 % and the same or smaller cooling surfaces. Copper bars are not interleaved.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	c) For single-phase or multi-phase tests, the minimum length of any temporary connection to the test supply is 3 m, but this can be reduced to 2 m provided that the temperature rise at the supply end of the connection is not more than 5 K below the temperature rise in the middle of the connection length. The minimum length to a star point is 2 m.		N/A
	4) **For values of rated current higher than 4 000 A:**		**N/A**
	The original manufacturer determines all relevant items of the test, such as type of supply, number of phases and frequency (where applicable), cross-sections of test conductors, etc. This information is part of the test report.		N/A
10.10.2.3.3	**Measurement of temperatures**		**P**
	Thermocouples or thermometers shall be used for temperature measurements. For windings, the method of measuring the temperature by resistance variation shall generally be used.		P
	The thermometers or thermocouples shall be protected against air currents and heat radiation.		P
	The temperature shall be measured and recorded at all points given in 9.2. Particular attention shall be given to joints in conductors and terminals within the main circuits. Specific points are specified in 10.10.2.3.5 and 10.10.2.3.6.		P
	For measurement of the temperature of air inside a BTS, where applicable, several measuring devices shall be arranged in convenient places.		P
10.10.2.3.4	**Ambient air temperature**		**P**
	The thermometers or thermocouples shall be protected against air currents and heat radiation.		P
	The ambient temperature during the test is between +10 °C and +40 °C.	23,5°C	P
	The ambient temperature is the average value of all measurement points of ambient air temperature.		P
10.10.2.3.5	**Test of a BT run**		**P**
	A feeder unit and one or more representative straight lengths (see 10.10.2.2.2) shall be joined together, with all their covers in place, forming a BT run including at least two joints for a total length of at least 6 m.		P
	BTS accessories (for example, elbows, flexible BTUs, etc.) may be incorporated in the most appropriate position along the BT run and tested by the same procedure.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	This representative arrangement shall be mounted in its reference mounting conditions and tested at its rated current Inc.		P
	The temperature of conductors shall be measured in the middle of the BT run length, and at each joint. The temperature of the corresponding parts of the enclosure shall be measured on all free sides.		N/A
	a) Horizontal orientation		P
	The BT run shall be supported horizontally at approximately 1 m from the floor.		P
	The ambient air temperature shall be measured in the immediate vicinity of the centre of the BT run, at the same level and at a distance of approximately 1 m from both of the longitudinal sides of the enclosure.		P
	b) Vertical orientation		P
	The BT run shall be arranged vertically, i.e. with at least 4 m in the vertical position and fixed to a rigid structure in accordance with the original manufacturer's instructions.		P
	The ambient air temperature shall be measured at 1,5 m down from top end of test arrangement at a distance of approximately 1 m from each of the longitudinal sides of the enclosure.		P
10.10.2.3.6	**Test of a tap-off unit**		**N/A**
	The tap-off unit shall be fitted in the reference mounting conditions to a BT run having a rated current of not less than twice the rated current of the tap-off unit (or the nearest available).		N/A
	The tap-off unit shall carry its rated current and the BT run shall carry its own rated current up to the tap-off position.		N/A
	The temperature rises of joints in conductors and terminals of devices in the main circuit, and of the corresponding parts of all free sides of the enclosure of the tap-off unit shall be measured, as well as the temperature rise of conductors and corresponding parts of enclosure of the BTU where the tap-off unit is connected.		N/A
	a) Horizontal orientation		N/A
	The BT run shall be arranged according to 10.10.2.3.5 item a).		N/A
	The tap-off unit shall be positioned as centrally as possible onto the BT run.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The ambient air temperature shall be measured in the immediate vicinity of the centre of the tap-off unit under test, at the same level and at a distance of approximately 1 m from both of the longitudinal sides of the enclosure of the tap-off unit.		N/A
	b) Vertical orientation		N/A
	The BT run shall be arranged according to 10.10.2.3.5 item b).		N/A
	The tap-off unit shall be positioned in such a way that its centre is at a level approximately 1,5 m down from top end of BT run.		N/A
	The ambient temperature shall be measured at a level of the centre of tap-off unit under test at a distance of approximately 1 m from each of the longitudinal sides of the enclosure.		N/A
10.10.2.3.7	**Test of a tap-off unit with several outgoing circuits**		**N/A**
	If all outgoing circuits of the tap-off unit can simultaneously and continuously be loaded with their rated current (RDF = 1), then 10.10.2.3.6 applies, with all outgoing circuits loaded to their rated current.		N/A
	If the rated diversity factor is lower than 1, then the tap-off unit shall be tested in two steps:		N/A
	a) each type of outgoing circuit shall be tested individually, at its rated current, according to 10.10.2.3.6.		N/A
	b) the complete tap-off unit shall be loaded to its rated current and each outgoing circuit to its rated current multiplied by the rated diversity factor. If the rated current of the tap-off unit is less than the sum of the test currents of all outgoing circuits (i.e. the rated currents multiplied by the diversity factor), then the outgoing circuits shall be split into groups corresponding to the rated current of the tap-off unit. The groups shall be formed in a manner so that the highest possible temperature rise is obtained. Sufficient groups shall be formed and tests undertaken so as to include all different variants of outgoing circuits in at least one group		N/A
10.10.2.3.8	**Results to be obtained**		P
	At the end of the test, the temperature rise does not exceed the values specified in Table 6.	See table	P
	The apparatus shall operate satisfactorily within the voltage limits specified for them at the temperature inside the BTS.		P
10.10.3	**Derivation of the rated current of the variants**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
10.10.3.1	**General**		**N/A**
	Temperature-rise tests carried out at 50 Hz are applicable to 60 Hz for rated currents up to and including 800 A. In the absence of tests at 60 Hz for currents above 800 A, the rated current at 60 Hz is reduced to 95 % of that at 50 Hz.		N/A
	where the maximum temperature rise at 50 Hz does not exceed 90 % of the permissible value, then de-rating for 60 Hz is not required.		N/A
	Temperature-rise tests carried out at particular frequencies are applicable at the same rated current to lower frequencies, including d.c.		N/A
10.10.3.2	**Busbar trunking units**		**N/A**
	The rated current of similar variants of a tested BTU (see 10.10.2.2.2) shall be calculated using the following derating formula:		N/A
	$I_{n2} = I_{n1} \times S2 / S1$ I_{n2} is the rated current to be calculated; I_{n1} is the rated current of the tested BTU; S2 is the cross-sectional area of the conductors of the variant BTU; S1 is the cross-sectional area of the conductors of a tested BTU.		N/A
10.10.3.3	**Tap-off units**		**N/A**
	The rated current of similar variants of a tested tap-off unit (see 10.10.2.2.3) shall be calculated using the following derating formula:		N/A
	$I_{ntou2} = I_{max2} \times I_{ntou1} / I_{max1}$ I_{ntou2} is the rated current to be calculated; I_{ntou1} is the rated current of the tested tap-off unit; I_{max2} is the maximum possible current of the variant tap-off unit; I_{max1} is the maximum possible current of the tested tap-off unit.		N/A
10.11	**SHORT-CIRCUIT WITHSTAND STRENGTH**		**P**
	The short-circuit withstand strength declared by the original manufacturer is verified. Verification may be by the application of design rules, by calculation or by test as specified.		P
	The original manufacturer should take into consideration the other arrangements, the short-circuit current ratings of which are to be derived according to 10.11.3 from the tested arrangements.		P
10.11.3	**Verification by comparison with a reference design – Utilising a check list**		**P**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Verification is achieved when comparison of the BTS to be verified with an already tested design meets all the following requirements:		P
	a) items 1 to 3, and 5 to 10 of the check list in Table 13 of Part 1; b) the busbar supports of each circuit of the BTS to be assessed are of the same type, shape and material and have the same or smaller spacing, along the length of the busbar, as the reference design, and insulation materials are of the same type, shape and thickness.		P
	Should any requirements in the check list not be met, verification will be made by test according to 10.11.5 of Part 1.		N/A
10.11.5	**Verification by test**		**N/A**
10.11.5.1	**Test arrangement**		**N/A**
	The BTS or its parts as necessary to complete the test shall be mounted as in normal use.		N/A
10.11.5.2	**Performance of the test – General**		**N/A**
	If the test circuit incorporates fuses, fuse-links with the maximum let-through current and, if required, of the type indicated by the original manufacturer as being acceptable, they are used.		N/A
	The supply conductors and the short-circuit connections required for testing the BTS have sufficient strength to withstand short-circuits and be so arranged that they do not introduce any additional stresses on the BTS.		N/A
	Unless otherwise agreed, the test circuit is connected to the input terminals of the BTS. Three-phase BTS are connected on a three-phase basis.		N/A
	All parts of the equipment intended to be connected to the protective conductor in service, including the enclosure, are connected as follows:		N/A
	1) for BTS suitable for use on three-phase four-wire systems (see also IEC 60038) with an earthed star point and marked accordingly, to the neutral point of supply or to a substantially inductive artificial neutral permitting a prospective fault current of at least 1500 A;		N/A
	2) for BS also suitable for use in three-phase three-wire as well as on three-phase four-wire systems and marked accordingly, to the phase conductor least likely to arc to earth.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The connection mentioned in 1) and 2) include a fusible element consisting of a copper wire of 0,8 mm diameter and at least 50 mm long, or of an equivalent fusible element for the detection of a fault current.		N/A
10.11.5.3	**Testing of main circuits**		**N/A**
	Circuits are tested with the highest thermal and dynamic stresses that may result from short circuit currents up to the rated values for one or more of the following conditions as declared by the original manufacturer.		N/A
	Not dependent upon a SCPD. The BTS is tested with the rated peak withstand current and the rated short-time withstand current for the specified duration		N/A
	Dependent upon an incoming SCPD included within the BTS. The BTS is tested with an incoming prospective short-circuit current for a period time that is limited by the incoming SCPD.		N/A
	Dependent upon an upstream SCPD. The BTS is tested to the let through values permitted by the upstream SCPD as defined by the original manufacturer.		N/A
	Where an incoming or outgoing circuit includes a SCPD that reduces the peak and/or duration of the fault current, then the circuit is tested allowing the SCPD to operate and interrupt the fault current		N/A
	If the SCPD contains an adjustable short-circuit release, then this is set to the maximum allowed value		N/A
	One of each type of circuit is subject to a short-circuit test		N/A
10.11.5.3.2	**Outgoing circuits**		**N/A**
	The tap-off unit shall be fitted to a BTU, arranged as in 10.11.5.3.3, as near as practicable to the incoming end.		N/A
	The outgoing terminals of outgoing circuits are provided with a bolted short-circuit connection.		N/A
	When the protective device in the outgoing circuit is a circuit-breaker, the test circuit may include a shunting resistor in accordance with 8.3.4.1.2 b) of IEC 60947-1 in parallel with the reactor used to adjust the short-circuit current.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breakers having a rated current up to and including 630 A, a conductor 0,75 m in length having a cross-sectional area corresponding to the rated current (see Tables 11 and 12) is included in the test circuit.		N/A
	The switching device is closed and held closed in the manner normally used in service. The test voltage is then applied once and,		N/A
	a) for a time sufficiently long to enable the short-circuit protective device in the outgoing unit to operate to clear the fault and, in any case, for not less than 10 cycles (test voltage duration), or		N/A
	b) in cases where the outgoing circuit does not include a SCPD, for a magnitude and duration as specified for the busbars by the original manufacturer. Testing of outgoing circuits may also result in the operation of the incoming circuit SCPD.		N/A
10.11.5.3.3	**Incoming circuit and main busbars**		**N/A**
	The test shall be carried out on a BTS comprising at least one feeder BTU connected to the appropriate number of straight length BTUs to obtain a length of not more than 6 m including at least one joint.		N/A
	For the verification of rated short-time withstand current (see 5.3.5 of Part 1) and rated peak withstand current (see 5.3.4 of Part 1), a greater length may be used provided the peak value and the r.m.s. value of the a.c. component of the test current are respectively at least equal to the rated peak withstand current and to the rated short-time withstand current (see 10.11.5.4 b) of Part 1).		N/A
	BTUs not included in the above test are assembled as in normal use and tested separately.		N/A
10.11.5.3.4	**Connections to the supply side of outgoing units**		**N/A**
	Where an BTS contains conductors between a main busbar and the supply side of outgoing functional units that do not fulfil the requirements of 8.6.4 one circuit of each type is subject to an additional test.		N/A
	A short-circuit is obtained by bolted connections on the conductors connecting the busbars to a single outgoing unit, as near as practicable to the terminals on the busbar side of the outgoing unit. The value of the short-circuit current is the same as that for the main busbars.		N/A
10.11.5.3.5	**Neutral conductor**		**N/A**

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	If a neutral conductor exists within a circuit it is subjected to one test to prove its short-circuit withstand strength in relation to the nearest phase conductor of the circuit under test including any joints.		N/A
	Unless otherwise agreed between the original manufacturer and the User, the value of the test current in the neutral is at least 60 % of the phase current during the three-phase test.		N/A
	The test need not be executed if the test is intended to be made with a current of 60 % of the phase current and if the neutral conductor is:		N/A
	– the same shape and cross- section as the phase conductors		N/A
	– supported in an identical manner as the phase conductors and with support centres along the length of the conductor not greater than that of the phases;		N/A
	– spaced at a distance from the nearest phase(s) not less than that between phases;		N/A
	– spaced at a distance from earthed metalwork not less than the phase conductors.		N/A
10.11.5.4	**Value and duration of the short-circuit current**		**N/A**
	For all short-circuit withstand ratings, the dynamic and thermal stresses are verified with a prospective current, at the supply side of the specified protective device, if any, equal to the value of the rated short-time withstand current, rated peak withstand current or rated conditional short-circuit current assigned.		N/A
	For the verification of all the short-circuit withstand ratings (see 5.3.3 to 5.3.5 inclusive), the value of the prospective short-circuit current at a test voltage equal to 1,05 times the rated operational voltage shall be determined from a calibration oscillogram which is taken with the supply conductors to the BTS short-circuited by a connection of negligible impedance placed as near as possible to the input supply of the BTS. The oscillogram shall show that there is a constant flow of current such that it is measurable at a time equivalent to the operation of the protective device incorporated in the BTS or for the specified duration (see 9.3.2. a)).		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The value of current during the calibration is the average of the r.m.s. values of the a.c. component in all phases. When making the tests at maximum operational voltage, the calibration current in each phase is equal to the rated short-circuit current within a +5 % tolerance and the power factor is within a -0,05 tolerance.		N/A
	All tests shall be made at the rated frequency of the ASSEMBLY with a tolerance of ± 25 %, and at the power factor appropriate to the short-circuit current in accordance with Table 7.		N/A
	a) For a test at rated conditional short circuit current Icc, whether the protective devices are in the incoming circuit of the BTS or elsewhere, the test voltage shall be applied for a time sufficiently long to enable the short-circuit protective devices to operate to clear the fault and, in any case, for not less than 10 cycles. The test shall be conducted at 1,05 times the rated operational voltage with prospective short circuit currents, at the supply side of the specified protective device, equal to the value of the rated conditional short-circuit current. Tests at lower voltages are not permitted.		N/A
	b) For a test at rated short-time withstand current and rated peak withstand current, the dynamic and thermal stresses shall be verified with a prospective current equal to the value of rated short-time withstand current and rated peak withstand current declared. The current shall be applied for the specified time during which the r.m.s. value of its a.c. component shall remain constant.		N/A
	In the case of test station difficulty of making the short-time or peak withstand tests at the maximum operational voltage, the tests according to 10.11.5.3.3, 10.11.5.3.4 and 10.11.5.3.5 are made at any convenient voltage, with the original manufacturer's agreement, the actual test current being, in this case, equal to the rated short-time current or peak withstand current. This shall be stated in the test report.		N/A
	The peak current withstand test and the short-time current test may be separated. In this case, the time during which the short-circuit is applied for the peak current withstand test shall be such that the value I 2t is not larger than the equivalent value for the short-time current test, but it shall be not less than three cycles.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Where the required test current in each phase cannot be achieved the positive tolerance may be exceeded with the agreement of the original manufacturer.		N/A
10.11.5.5	**Results to be obtained**		**N/A**
	After the test deformation of busbars and conductors is acceptable provided that the clearances and creepage distances specified in 8.3 are still complied with.		N/A
	The characteristics of the insulation remains such that the mechanical and dielectric properties of the equipment satisfy the requirements of the relevant BTS standard.		N/A
	A busbar insulator or support or cable restraint has not separated into two or more pieces.		N/A
	There are no cracks appearing on opposite sides of a support and no cracks, including surface cracks, running the full length or width of the support.		N/A
	There are no loosening of parts used for the connection of conductors and the conductors are not separated from the outgoing terminals.		N/A
	Distortion of the busbars or structure of the BTS that impairs its normal use are a failure.		N/A
	Any distortion of the busbars or structure of the BTS that impairs normal insertion or removal of the removable parts is a failure.		N/A
	Damage is acceptable for tap-off unit contacts (e.g.: trolley brushes) intended to be periodically replaced according to the manufacturer's instructions.		N/A
	Deformation of the enclosure or of the internal partitions, barriers and obstacles due to short-circuit is permissible to the extent that the degree of protection is not impaired and the clearances or creepage distances are not reduced to values, which are less than those specified		N/A
	Additionally after the tests incorporating short-circuit protective devices, the tested equipment is capable of withstanding the dielectric test at a value of voltage for the "after test" condition prescribed in the relevant short-circuit protective device standard for the appropriate short-circuit test, as follows:		N/A
	a) between all live parts and the exposed conductive parts of the BTS, and		N/A
	b) between each pole and all other poles connected to the exposed conductive parts of the BTS.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	If tests a) and b) above are conducted, they are carried out with any fuses replaced and with any switching device closed.		N/A
	The fusible element (see 10.11.5.2.), if any, does not indicate a fault current.		N/A
10.11.5.6	**Testing of the protective circuit**		**N/A**
	A single-phase test supply is connected to the incoming terminal of one phase and to the terminal for the incoming protective conductor.		N/A
	When the BTS is provided with a separate protective conductor, the nearest phase conductor is used.		N/A
	For each representative outgoing unit, a separate test is made with a bolted short-circuit connection between the corresponding outgoing phase terminal of the unit and the terminal for the relevant outgoing protective conductor.		N/A
	Each outgoing unit on test is fitted with its intended protective device. Where alternative protective devices can be incorporated in the outgoing unit, the protective device which lets through the maximum values of peak current and I 2t is used.		N/A
	For this test, the frame of the BTS is insulated from earth. The test voltage is equal to 1,05 times the single-phase value of the rated operational voltage.		N/A
	Unless otherwise agreed between the original manufacturer and the user, the value of the test current in the protective conductor is at least 60 % of the phase current during the three-phase test of the BTS.		N/A
	All other conditions of this test are analogous to 10.11.5.2 to 10.11.5.4 inclusive.		N/A
10.11.5.6.2	**Results to be obtained**		**N/A**
	The continuity and short-circuit withstand strength of the protective circuit, whether it consists of a separate conductor or the enclosure, shall not be significantly impaired.		N/A
	In the case of a tap-off unit, this may be verified by measurements with a current of the order of the rated current of the tap-off unit.		N/A
	In the case of a BTU, following the test and after sufficient time for the bar to cool to ambient temperature, the fault-loop resistance phase to PE Rb20phPEN or Rb20phPE should not be increased by more than 10 % (see 5.101).		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Where the enclosure is used as the protective conductor, sparks and localised heating at joints are permitted, provided that they do not impair the electrical continuity and provided adjacent flammable parts are not ignited.		N/A
	Deformation of the enclosure or of the internal partitions, barriers and obstacles due to short-circuit is permissible to the extent that the degree of protection is not apparently impaired and the clearances or creepage distances are not reduced to values which are less than those specified in 8.3 of Part 1.		N/A
10.12	**ELECTROMAGNETIC COMPATIBILITY (EMC)**		**N/A**
	For EMC tests, see J.10.12.		N/A
10.13	**MECHANICAL OPERATION**		**P**
	This verification test is not made on such devices of the BTS which have already been type tested according to their relevant product standard unless their mechanical operation is impaired by their mounting.		N/A
	For parts, which need verification by test, satisfactory mechanical operation is verified after installation in the BTS. The number of operating cycles is 50.		P
	At the same time, the operation of the mechanical interlocks associated with these movements is checked.		P
	The test is passed if the operating conditions of the apparatus, interlocks, specified degree of protection etc., have not been impaired and if the effort required for operation is practically the same as before the test.		P
	In the case of withdrawable parts, the operating cycle includes any physical movements from the connected to the isolated position and back to the connected position.		N/A
	For trolley-type tap-off units, the speed of the trolley carrying the sliding contacts and the distance through which it moves shall be determined in accordance with the operating conditions for which it is designed.		N/A
	If the trolley is intended to support a tool or other mechanical load, an equivalent weight shall be suspended from it during the test.		N/A
	After completion of the test, there shall be no mechanical or electrical defect, whether by undue pitting, burning or welding of the contacts.		P

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
10.101	**RESISTANCE TO FLAME-PROPAGATION**		**P**
	The test is suitable for all types or sizes of BTU to characterize the resistance to flame propagation of the BTS in mounting and grouping conditions met in practice. The test shall be performed according to IEC 60332-3-10, with a flame application time of 40 min.		P
	The test is made on a straight length BT run with at least a length of 3 m and a joint.		P
	Three straight BT runs of the same type shall be placed vertically at regular intervals on a vertical ladder into a fire test rig; every BT run shall present a different side to the burner flame impact.		P
	In case of large-width BT runs, the number of straight length units under test may be reduced, but in this case the test shall be repeated to carry out the three types of test concerning the orientation of the sides of the enclosure.		N/A
	For BTUs with tap-off facilities, one tap-off outlet side shall be fitted as in normal use (for example, with cover), oriented to the burner, and located in the immediate vicinity of the burner flame's impact.		N/A
	After burning has ceased, the BT run enclosures should be wiped clean. All soot is ignored if, when wiped off, the original surface is undamaged. Softening or any deformation of the non-metallic material is also ignored. The maximum extent of the damage is measured in metres, to one decimal place, from the bottom edge of the burner to the onset of char.		P
	The system is deemed having passed the test if • it does not ignite; • the charred portion (external or internal) of the BT runs has not reached a height exceeding 2,5 m above the bottom edge of the burner.		P
10.102	**FIRE RESISTANCE IN BUILDING PENETRATIONS**		**N/A**
	The test is suitable for fire barrier BTU designed to prevent the spread of fire through building penetration. The test is performed according to ISO 834-1 for fire resistance times of 60 min, 90 min, 120 min, 180 min or 240 min.		N/A
	The test shall be made on a representative straight length BTU samples. The sample, including any additional parts, shall be mounted on a test floor and the void around the sample shall be filled with a fire seal.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	The test floor shall be made of concrete; its thickness shall be in accordance with the required fire resistance time. The fire seal shall be in accordance with the fire safety building requirements.		N/A
	The whole arrangement shall be mounted according to building practice and shall meet any original manufacturer's instructions.		N/A
	A set of thermocouples shall be located on the unexposed side of the sample to record the surface temperatures of the fire barrier BTU enclosure.		N/A
	The various dimensions according to Figure 103 shall be recorded in the test report.		N/A
	The criteria of performance are as given in ISO 834-1.		N/A
	The test with a test floor is valid for penetration through walls.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX J: ELECTROMAGNETIC COMPATIBILITY (EMC)		**N/A**
J.9.4	**Performance requirements**		**N/A**
J.9.4.1	**General**		**N/A**
	The environmental condition A / B for which the BTS is suitable is stated by the BTS manufacturer.		N/A
J.9.4.2	**Requirement for testing**		N/A
	No EMC immunity or emission tests are required on final BTS if the following conditions are fulfilled:		N/A
	a) The incorporated devices and components are in compliance with the requirements for EMC for the stated environment (see J.9.4.1) as required by the relevant product or generic EMC standard.		N/A
	b) The internal installation and wiring is carried out in accordance with the devices and Components Manufacturers' instructions (arrangement with regard to mutual influences, cable, screening, earthing etc.)		N/A
	In all other cases the EMC requirements are to be verified by tests as per J.10.12.		N/A
J.9.4.3	**Immunity**		N/A
J.9.4.3.1	**BTS not incorporating electronic circuits**		N/A
	Under normal service conditions, BTS not incorporating electronic circuits are not sensitive to electromagnetic disturbances and therefore no immunity tests are required.		N/A
J.9.4.3.2	**BTS incorporating electronic circuits**		N/A
	Electronic equipment incorporated in BTS comply with the immunity requirements of the relevant product or generic EMC standard and are suitable for the specified EMC environment stated by the BTS manufacturer.		N/A
	In all other cases the EMC requirements are to be verified by tests as per J.10.12.		N/A
	Equipment utilizing electronic circuits in which all components are passive (for example diodes, resistors, varistors, capacitors, surge suppressors, inductors) are not required to be tested.		N/A
	The BTS manufacturer obtains from the device and or component manufacturer the specific performance criteria of the product based on the acceptance criteria given in the relevant product standard.		N/A
J.9.4.4	**Emission**		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
J.9.4.4.1	**BTS not incorporating electronic circuits**		N/A
	For BTS not incorporating electronic circuits, electromagnetic disturbances can only be generated by equipment during occasional switching operations. The duration of the disturbances is of the order of milliseconds. The frequency, the level and the consequences of these emissions are considered as part of the normal electromagnetic environment of lowvoltage installations. Therefore, the requirements for electromagnetic emission are deemed to be satisfied, and no verification is necessary.		N/A
J.9.4.4.2	**BTS incorporating electronic circuits**		N/A
	Electronic equipment incorporated in the BTS comply with the emission requirements of the relevant product or generic EMC standard and are suitable for the specific EMC environment stated by the BTS manufacturer.		N/A
J.10.12	**Tests for EMC**		N/A
	The emission and immunity tests are carried out in accordance with the relevant EMC standard (see Tables J.1, J.2, J.3 and J.4); however, the BTS manufacturer specifies any additional measures necessary to verify the criteria of performance for the BTS if necessary (e.g. application of dwell times).		N/A
J.10.12.1	**Immunity tests**		N/A
J.10.12.1.1	**BTS not incorporating electronic circuits**		N/A
	No tests are necessary.		N/A
J.10.12.1.2	**BTS incorporating electronic circuits**		N/A
	Tests are made according to the relevant environment: A or B		N/A
	The values used are given in Tables J.3 and/or J.4 except where a different test level is given in the relevant specific product standard and justified by the electronic components manufacturer.		N/A
	Electrostatic discharge immunity test IEC 61000-4-2	Performance criterion A/B/C	N/A
	Radiated radio-frequency electromagnetic field immunity test IEC 61000-4-3 at 80 MHz to 1 GHz and 1,4 GHz to 2 GHz	Performance criterion A/B/C	N/A
	Electrical fast transient/burst immunity test IEC 61000-4-4	Performance criterion A/B/C	N/A
	1,2/50 µs and 8/20 µs surge immunity test IEC 61000-4-5	Performance criterion A/B/C	N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	Conducted radio-frequency immunity test IEC 61000-4-6 at 150 kHz to 80 MHz	Performance criterion A/B/C	N/A
	Immunity to power-frequency magnetic fields IEC 61000-4-8	Performance criterion A/B/C	N/A
	Immunity to voltage dips and interruptions IEC 61000-4-11	Performance criterion A/B/C	N/A
	Immunity to harmonics in the supply IEC 61000-4-13	Performance criterion A/B/C	N/A
J.10.12.2	**Emission tests**		N/A
J.10.12.2.1	**BTS not incorporating electronic circuits**		N/A
	No tests are necessary		N/A
J.10.12.2.2	**BTS incorporating electronic circuits**		N/A
	Tests are made according to the relevant environment: A or B		N/A
	The test methods used; see J.9.4.4.2.		N/A
	If the BTS incorporates telecommunication ports, the emission requirements of CISPR 22, relevant to that port and to the selected environment, applies.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX K: PROTECTION BY ELECTRICAL SEPARATION		N/A
K.2	**Electrical separation**		N/A
K.2.2	**Supply source**		N/A
	The circuit is supplied through a source that provides separation i.e.		N/A
	• an isolating transformer, or		N/A
	• a source of current providing a degree of safety equivalent to that of the isolating transformer specified above, for example a motor generator with windings providing equivalent isolation.		N/A
	Mobile sources of supply connected to a supply system are selected in accordance with Clause K.3 (class II equipment or equivalent insulation).		N/A
	Fixed sources of supply are either:		N/A
	• selected in accordance with Clause K.3, or		N/A
	• such that the output is separated from the input and from the enclosure by an insulation satisfying the conditions of Clause K.3; if such a source supplies several items of equipment, the exposed conductive parts of that equipment are not connected to the metallic enclosure of the source.		N/A
K.2.3	**Selection and installation of supply source**		N/A
K.2.3.1	**Voltage**		N/A
	The voltage of the electrically separated circuit does not exceed 500 V.		N/A
K.2.3.2	**Installation**		N/A
	Live parts of the separated circuit are not connected at any point to another circuit or to earth.		N/A
	To avoid the risk of a fault to earth, particular attention is given to the insulation of such parts from earth, especially for flexible cables and cords.		N/A
	Arrangements ensure electrical separation not less than that between the input and output of an isolating transformer.		N/A
	Flexible cables and cords are visible throughout any part of their length liable to mechanical damage.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	For separated circuits, the use of separate wiring systems is necessary. If the use of conductors of the same wiring system for the separated circuits and other circuits is unavoidable, multi-conductor cables without metallic covering, or insulated conductors in insulating conduit, ducting or trunking is used, provided that their rated voltage is not less than the highest voltage likely to occur, and that each circuit is protected against overcurrent.		N/A
K.2.4	**Supply of a single item of apparatus**		N/A
	Where a single item of apparatus is supplied, the exposed conductive parts of the separated circuit is not connected either to the protective conductor or exposed conductive parts of other circuits.		N/A
K.2.5	**Supply of more than one item of apparatus**		N/A
	If precautions are taken to protect the separated circuit from damage and insulation failure, a source of supply, complying with K.2.1, may supply more than one item of apparatus provided that all the following requirements are fulfilled.		N/A
	a) The exposed-conductive-parts of the separated circuit is connected together by insulated non-earthed equipotential bonding conductors. Such conductors are not connected to the protective conductors or exposed-conductive-parts of other circuits or to any extraneous conductive parts.		N/A
	b) All socket-outlets are provided with protective contacts which are connected to the equipotential bonding system provided in accordance with item a).		N/A
	c) Except where supplying class II equipment, all flexible cables embody a protective conductor for use as an equipotential bonding conductor.		N/A
	d) It is ensured that if two faults affecting two exposed conductive parts occur and these are fed by conductors of different polarity, a protective device disconnects the supply in a disconnecting time conforming to Table K.1.		N/A
	For voltages which are within the tolerance band stated in IEC 60038, the disconnecting time appropriate to the nominal voltage applies.		N/A
	For intermediate values of voltage, the next higher value in table K.1 is to be used.		N/A
K.3	**Class II equipment or equivalent insulation**		N/A
	Protection is provided by electrical equipment of the following types:		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict
	• Electrical equipment having double or reinforced insulation (class II equipment)		N/A
	• BTS having total insulation see 8.4.3.4.		N/A
	This equipment is marked with the symbol ⧈.		N/A

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE 1: Component List			N/A
name of component	**type**	**rating**	**IEC standard**	**manufacture**
supplementary information:				

	TABLE: Heating Test		N/A
	Test voltage (V)..... :		—
	Ambient (°C).....:		—
Thermocouple Locations	**max. temperature measured, (°C)**	**max. temperature limit, (°C)**	
Supplementary information:			

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE 2: Temperature-rise Test		**P**
	test current (A)..... :	**100A**	**--**
	cable cross-section and length (mm^2×m)……..…:	**-**	**--**
	ambient (°C) .....:	**21,5 °C**	**--**

thermocouple locations	**max. temperature-rise measured**	**max. temperature-rise limit**
external terminal (line)	**59,9K**	**70K**
joint 1	//	
joint 2	//	
external terminal (load)	**62,9K**	**70K**
accessible enclosure of busbar	//	
plug-in contact of tap-off units	//	
incoming terminal of tap-off units	//	
outgoing terminal of tap-off units	//	
accessible enclosure of tap-off units	//	
supplementary information: with 80A circuit-breaker		

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE 3: Short-circuit Withstand Strength				N/A
test locations	**test voltage**	**test current**	**peak value**	**power factor**	**test duration**
3 poles test					
N pole test					
PE pole test					
supplementary information: test oscillogram see page					

	TABLE 4: Resistance of Protective Circuit		N/A
test locations	**resistance measured before short-circuit test**	**resistance measured after short-circuit test**	**resistance limit**
			100 mΩ
			100 mΩ
			100 mΩ
			100 mΩ
supplementary information:			

	TABLE 5: Clearance and Creepage Distance Measurements					N/A
test locations	**clearance measured (mm)**		**clearance required (mm)**	**creepage distance measured(mm)**		**creepage distance required (mm)**
	before short-circuit test	**after short-circuit test**		**before short-circuit test**	**after short-circuit test**	
supplementary information:						

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE 6: Glow Wire Test							P
specimen				test temp. (°C)	no flaming or glowing	extinguish within 30s after removal of the glow-wire	no ignition of support	verdict
description	material	colour	thick(mm)					
enclosure	//	white	3	960	No	N/A	no	Pass
supplementary information:								

	TABLE7: Heating test, resistance method		N/A
	Test voltage (V) ..... :		—
	Ambient, t_1 (°C) ..... :		—
	Ambient, t_2 (°C) ..... :		—

Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	ΔT (K)	Max. dT (K)	Insulation class
Supplementary information:					

	TABLE8: Dielectric Strength	P
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)
Between pole and pole	1890	No
Between live part and encolusre	1890	No
Supplementary information:		

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE9: Electrical Data (in normal conditions)					N/A
fuse #	**I rated (A)**	**U (V)**	**P (W)**	**I (mA)**	**I fuse (mA)**	**condition/status**
Supplementary information:						

	TABLE10: Power Input Deviation				N/A
Input deviation of/at:	**P rated (W)**	**P measured (W)**	**Δ P**	**Required Δ P**	**Remark**
Supplementary information:					

	TABLE11: insulation resistance measurements		N/A
Insulation resistance R between:	**R (MΩ)**	**Required R (MΩ)**	
Between mains poles (primary fuse disconnected)			
Between parts separated by basic or supplementary insulation			
Between parts separated by double or reinforced insulation			
Supplementary information:			

	TABLE12: Impact Resistance			N/A
Impacts per surface	**Surface tested**	**Impact energy (Nm)**	**Comments**	
Supplementary information:				

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE13: Clearance And Creepage Distance Measurements					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Between poles	400	4,0kV	3,0	3,13	6,3	6,8
Between live part and	400	4,0kV	3,0	10,2	6,3	10,2
Supplementary information:						

	TABLE14: Distance Through Insulation Measurements			N/A
Distance through insulation di at/of:	U r.m.s. (V)	Test voltage (V)	Required di (mm)	di (mm)
Supplementary information:				

	TABLE15: Ball Pressure Test of Thermoplastics		N/A
Allowed impression diameter (mm) .....:			—
Part	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:			

	TABLE16: Threaded Part Torque Test			N/A
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
Supplementary information:				

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE17: Over-voltage and Under-voltage Test				N/A
Test	**Operating condition**	**Rated voltage (V)**	**Test voltage (V)**	**Temperature (°C)**	**Comments**
supplementary information:					

	TABLE18: Critical components information				N/A
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1])**
- Description:					
- Description:					
- Description:					
Supplementary information:					
[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

IEC 61439-6			
Clause	Requirement + Test	Result - Remark	Verdict

Figure 1: Test Arrangement of Temperature-rise Test

Photos of Temperature-rise Test

N/A

Figure 2: Test Arrangement of Short-circuit Withstand Strength Test

Photos of Short-circuit Withstand Strength Test

N/A

Test Oscillogram of Short-circuit Withstand Strength Test