



Electrical Safety Concept Main Document – National

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Only the German original version approved by the proprietor and the Swisscom AG electrical safety officer is legally binding. This is considered the state of the art in all installations in accordance with the area of application. The current, legally binding Electrical Safety Concept Main Document National can be downloaded from the following website: www.swisscom.ch/electro.

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1.0.0	07/11/2016	Electrical safety concept project team	Document for approval
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3.0.0	02/04/2021	Community expertise electrical (CEE)	Document for approval Significant changes from V2.1.0: <ul style="list-style-type: none"> • Layout adapted to Swisscom AG corporate design; • Provisions of ordinances and accepted principles of engineering updated; • ESTI decisions added; • Appendix A3.2 Authorisation and Responsibility Matrix completely revised; • Appendix A3.2.2 (PPE-E) completely revised. For detailed information, please contact the electrical safety officer

Review

Version	Review date	Inspected by	Comments
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Approval

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1 Introduction

Swisscom AG protects the physical and mental health of internal and external employees by means of appropriate strategies and measures. They include an environment and a work culture that permit employees to understand their own value for the company and to recognise that physical health is a success factor for the company. Managers act as examples. We take preventative steps to promote the physical and mental health of our employees. The goal is to encourage employees to take personal responsibility. Prevention includes good communication and adherence to ethical values.

Due to the risks involved in activities on electrical installations and the very high availability of electrical installations within the operational activities of Swisscom AG, the workgroup “Electrical Safety Concept” was established with members from Swisscom (Schweiz) AG, the current FM provider, and an independent consulting firm to develop an electrical safety concept for all Swisscom (Schweiz) AG installations that is in line with the values expressed above. The Head of Group Security requested that all Swisscom AG group companies be integrated into the electrical safety concept. This was incorporated into the present document (version 2.1.0 and higher) through close cooperation with the group companies Swisscom Broadcast AG and Swisscom Immobilien AG. With this document, Swisscom AG lives up to its statutory obligations as well as its duty of care.

The best policies and instructions are of no value unless everyone working on, with or near electrical installations is entirely familiar with these stipulations and all statutory requirements and strictly complies with them[19]. For this reason, the associated processes are described in this document in as much detail as possible, with few references to other documents.

1.1 Objective

As part of an information security management system, this electrical safety concept serves as the basis for a legally compliant electrical safety concept as per Art. 12 Heavy Current Ordinance (StV) [3] and the group solution “Safety at Swisscom” at Swisscom AG.

The hazards of working in the area of electrical installations are always present and must not be underestimated. The high fatality rates of accidents involving electrocution and the severe consequences of accidents involving burns from arcing faults highlight the special dangers of electricity. Sufficient measures for preventing and minimising the danger sources are implemented for continuous avoidance and reduction of accidents, occupational diseases, and work-related health impairments.

The goal of these measures is to prevent accidents and near misses in the operation of and work on, with or in the vicinity of electrical installations.

Other objectives are the high availability and safety of the electrical installations, which are essential for telecommunications operations.

1.2 Area of application

This electrical safety concept applies to all structures for the use of and all activities on, with or near electrical installations in Switzerland, Germany, Austria, Lichtenstein, Italy (excluding Fastweb) and France where Swisscom AG has the role of proprietor. This applies to electrical installations of all nominal voltages, from extra-low voltage to high voltage. These electrical installations serve to generate, transport, convert, distribute, and apply electrical energy [19]. The electrical safety concept describes the requirements for safe use of and work on, with or in the vicinity of electrical installations. These requirements apply to all operating, working and maintenance procedures. It applies to all non-electrical work, such as construction work, in operating areas and in the vicinity of cables as well as to electrical work that poses electrical danger.

The following figures show an object with building infeed at network level 5 (high voltage) and network level 7 (low voltage) as well as objects with telecommunications installations to depict the boundaries of the area of application.

1.2.1 Objects with building infeed at network level 5 (high voltage)

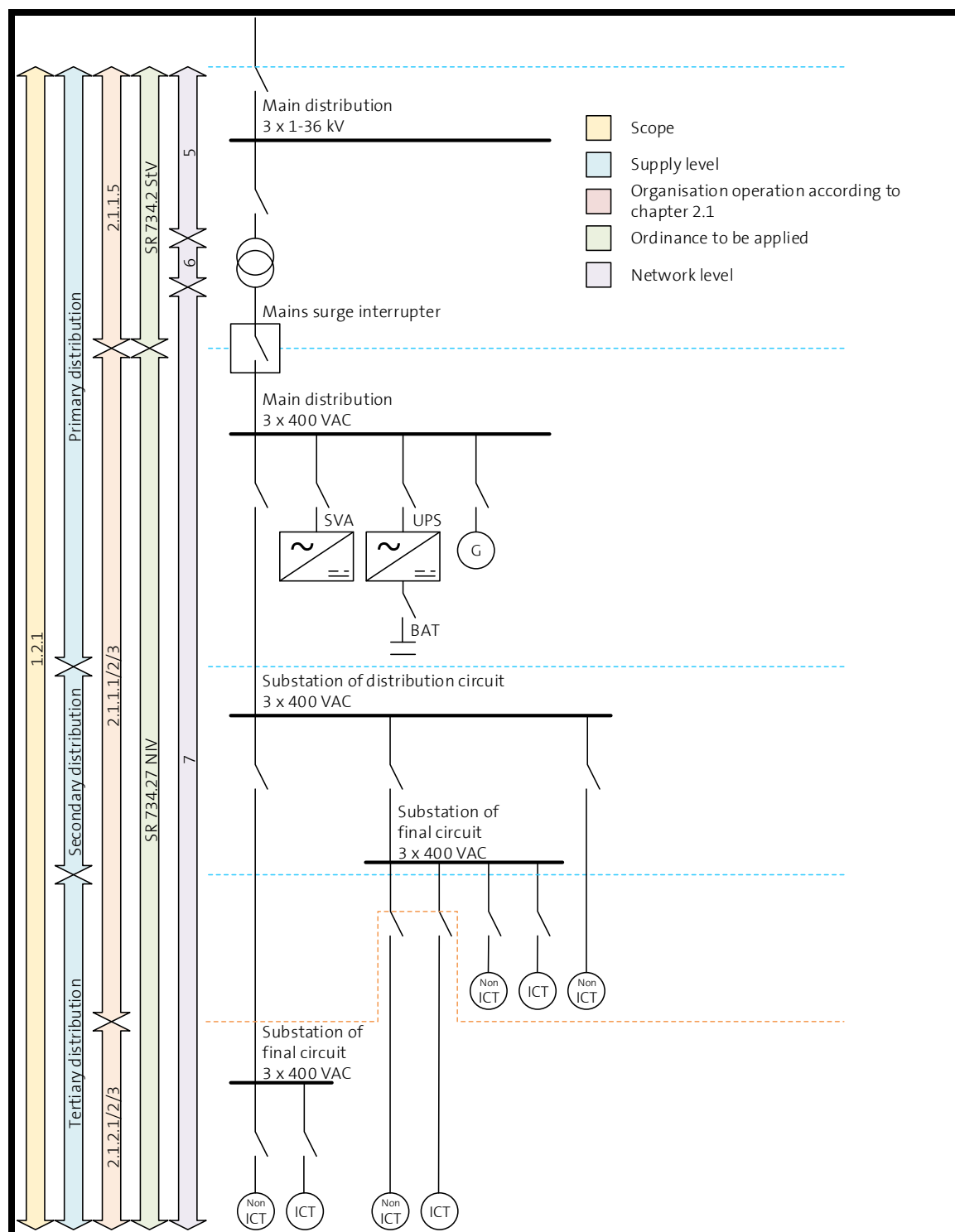


Chart 1.2.1: Area of application in objects with building infeed at network level 5

NOTE 1: This chart cannot be used for planning projects. Situation-specific planning is required for projects.

NOTE 2: Only applicable in objects where Swisscom AG has the role of proprietor for network level 5. In this case, Swisscom AG or the contracted FM provider functions as the site network operator. See Appendix A1.2.

NOTE 3: For customer installations in the Telehousing Metro category (third party proprietor), the point of disconnection is the input terminal of the third party switchgear combination.

1.2.2 Objects with building infeed at network level 7 (low voltage)

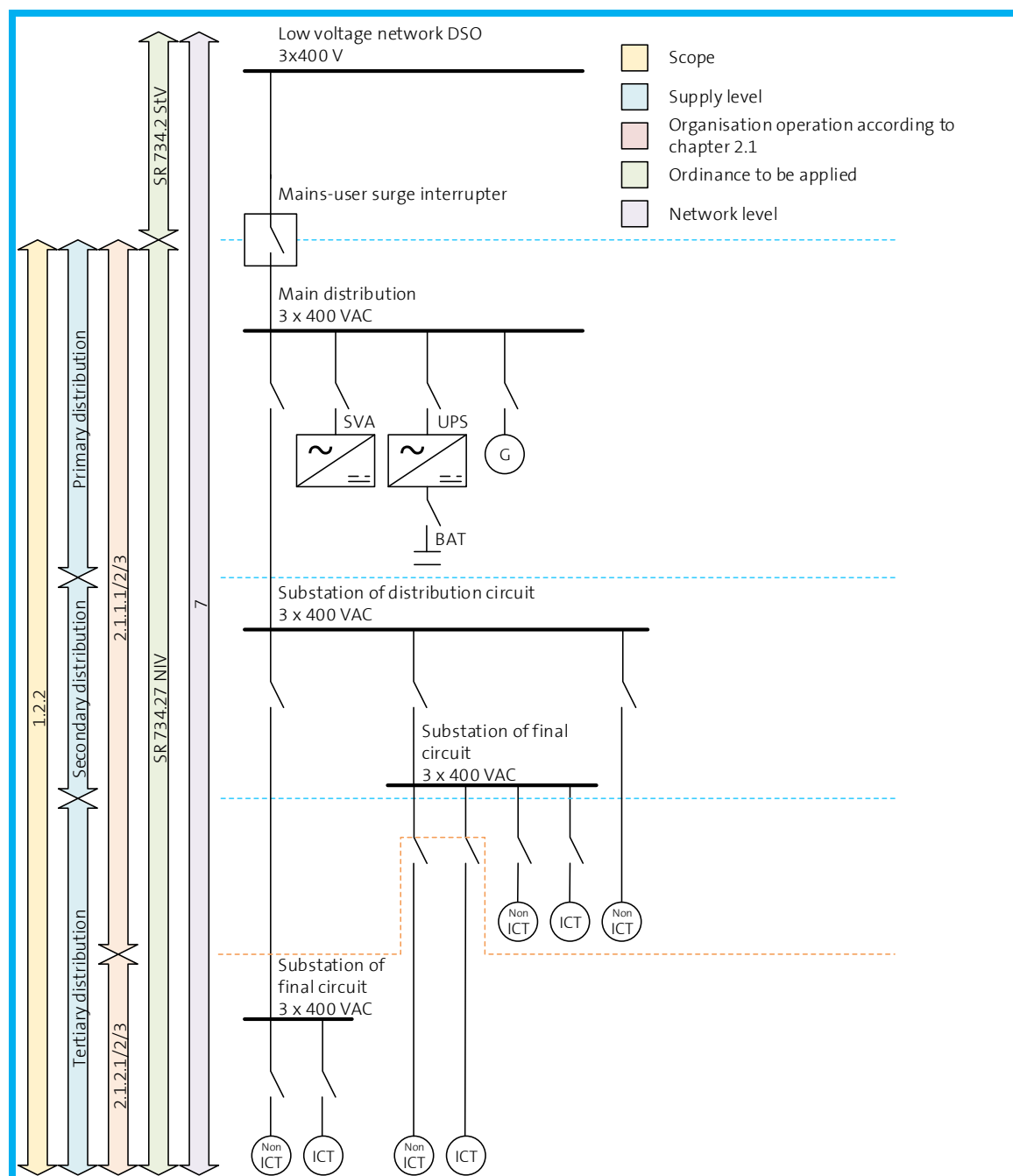


Chart 1.2.2: Area of application in objects with building infeed at network level 7

NOTE 1: This chart cannot be used for planning projects. Situation-specific planning is required for projects.

NOTE 2: In objects where Swisscom AG functions as proprietor for only a portion of the electrical installations, the area of application is limited to the corresponding user surge interrupter and its connected electrical installations. See Appendix A1.2.

If these electrical installations have only one switchgear combination for distributing the energy to the final circuits, these are assigned to the tertiary supply.

Examples:

- Cellular base stations and antennas in third party objects such as office buildings, shopping centres and the like;
- Broadcasting transmission installations;
- Indoor primary transmission points in third party objects such as office and residential buildings, shopping centres and the like;
- Swisscom Shops in third party objects such as office buildings, shopping centres and the like;
- Offices in third party objects such as office buildings and the like.

Otherwise, the boundary depicted above is to be applied accordingly.

NOTE 3: For customer installations in the Telehousing Metro category (third party proprietor), the point of disconnection is the input terminal of the customer switchgear combination.

1.2.3 Objects with telecommunications installations [1000]

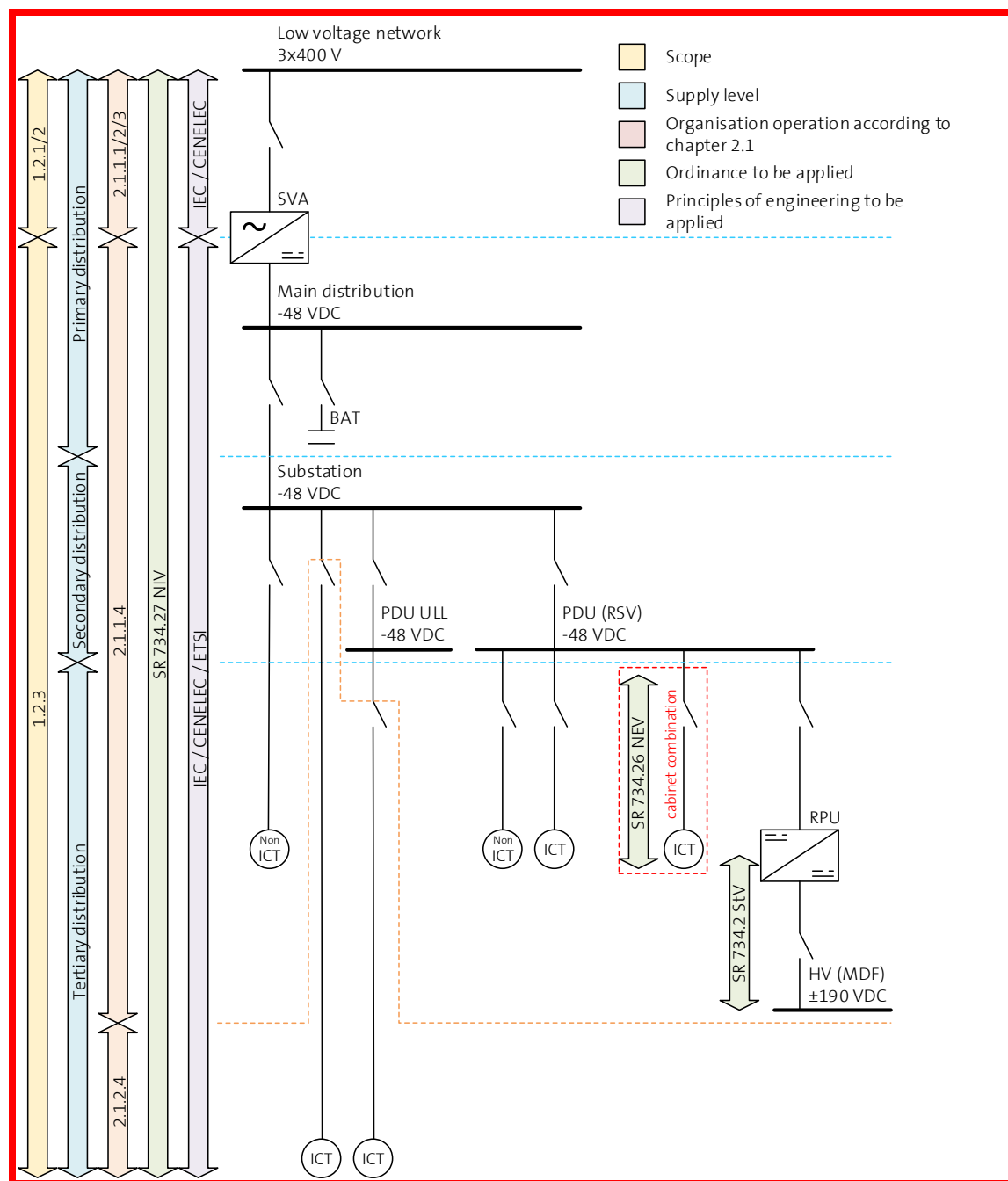


Chart 1.2.3: Application area in objects with telecommunications installations

NOTE 1: This chart cannot be used for planning projects. Situation-specific planning is required for projects.

NOTE 2: For installations in the tertiary supply, the Ordinance on Electrical Low-Voltage Products (NEV) [5] applies to connections between the series feed distributor and telecommunications installations in permanently connected cabinet combinations. Otherwise (for remote switchgear combinations), the Ordinance on Electrical Low-Voltage Installations (NIV) [6] applies.

NEV examples:

- Installation between series feed distributor and ICT equipment, if in the same cabinet combination (permanently connected, adjacent cabinets, racks or the like) ;
- Installation between series feed distributor and telecommunications installations, if in the same cabinet combination (permanently connected, adjacent cabinets, racks or the like) and relevant for telecommunications operations;
- Installation between power supply unit and ICT equipment, if in the same cabinet combination (permanently connected, adjacent cabinets, racks or the like);
- Installation between power supply unit and radio with pre-fabricated hybrid cables that were not manipulated and not run through special rooms (damp; wet; risk of corrosion, fire or explosion; room groups 1 and 2 for medical use, etc.)¹;
- Installation within compact installations (installations in which power supply system and telecommunications installations are housed in the same cabinet);
- Installations within individual cabinets, racks or the like.

NIV examples:

- Installation of supply line between power supply installations and series feed distributor;
- Installation between power supply systems and infrastructure systems such as emergency light, alarm, fire alarm and gas warning systems as well as access control systems and the like;
- Installation between series feed distributor and ICT equipment, if not in the same cabinet combination;
- Installation between power supply unit and ICT equipment, if not in the same cabinet combination;
- Installation between power supply unit and radio with pre-fabricated hybrid cables that have been manipulated or were run through special rooms (damp; wet; risk of corrosion, fire or explosion; room groups 1 and 2 for medical use, etc.);

All other, unlisted examples are considered installations as per NIV.

NOTE 3: The Ordinance on Electrical Low-Voltage Installations (NIV) [6] applies up to the connection terminals of the series feed distributor.

NOTE 4: For battery installations, the Ordinance on Electrical Low-Voltage Products (NEV) [5] applies. The point of disconnection between the Ordinance on Electrical Low-Voltage Installations (NIV) [6] and the

¹ Not applicable for periodic inspection as per NIV because it cannot be verified during the periodic inspection whether the cable has been manipulated.

Ordinance on Electrical Low-Voltage Products (NEV) [5] is the connecting lug. These connecting lugs are considered the point of disconnection to the conductors run in from outside. [1001]

NOTE 5: All installations created according to the Ordinance on Electrical Low-Voltage Installations (NIV) [6] require an installation permit as per Art. 9 NIV or a restricted installation permit as per Art. 13 NIV, Art. 14 NIV or Art. 15 NIV.

NOTE 6: For remote feed lines (coming from a remote power unit), the Ordinance on Telecommunications Installations [11], the Ordinance on Electrical Heavy Current Installations [3] and the Ordinance on Electrical Lines [8] apply.

NOTE 7: For weak current lines and telecommunications equipment outside buildings, the Ordinance on Telecommunications Installations [11] and the Ordinance on Electrical Weak Current Systems apply.

NOTE 8: For weak current lines inside buildings, the Ordinance on Telecommunications Installations [11] and the Ordinance on Electrical Weak Current Systems apply.

1.3 Target audience, reader prerequisites

The target audience of this electrical safety concept is persons who exercise the function of proprietor (B3.2.1), electrical safety officer (B3.2.2), electro agent (B3.2.3), person responsible for an electrical installation (B3.2.4) and nominated person in control of an electrical installation during work activities (B3.2.5). Correct understanding of the contents of this electrical safety concept requires extensive electrotechnical and electrical safety knowledge as well as understanding of the relevant processes. Guidelines and fact sheets are also available that contains information from the electrical safety concept summarised by topic and supplemented with examples and explanations.

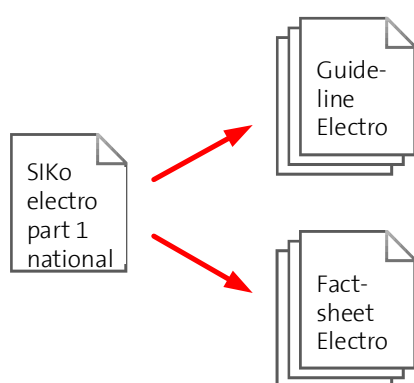


Chart 1.3: Relationship between electrical safety concept, guidelines and fact sheets

1.4 Structure of the electrical safety concept

The electrical safety concept is divided into multiple documents, with one part covering general aspects of all objects and multiple parts covering specific objects and object groups. Part 1 (general) specifies the fundamental, generally applicable requirements and describes the interfaces to higher level guidelines concerning work safety and protection of health that must also be taken into account. Part 2 (specific objects and object groups) contains requirements for the respective objects or object groups as well as persons and their authorisations, duties, competence and responsibilities.

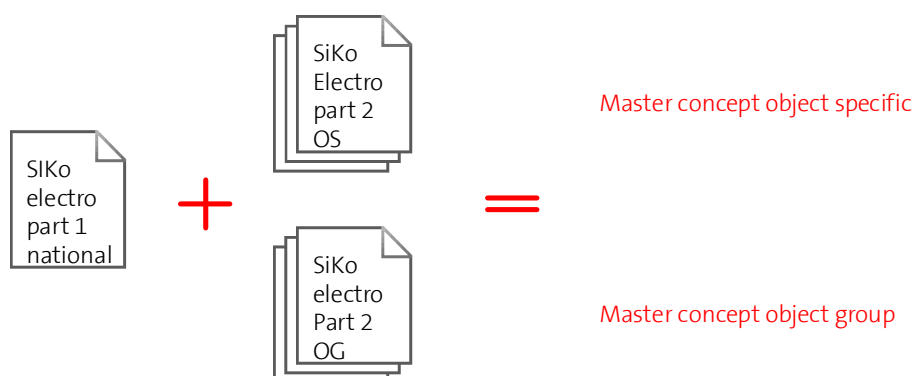


Chart 1.4: Relationship of Electrical Safety Concept Part 1 National and Part 2 Object-Specific (OS) and Part 2 Object Groups (OG)

1.4.1 Electrical safety concepts for objects (object classification² type A)

Doc. ID:	Object type:	City:	Address:	3BC:	WE:	BI:
SE-DSR-02468	Silver data centre	Aarau		730 KRE	1016	SCS
SE-DSR-02477	Silver data centre	Basel		620 BSG	1081	SCS
SE-DSR-02464	Silver data centre	Basel		620 BSW	1010	SCS
SE-DSR-02475	Silver data centre	Bellinzona		630 BEL	1069	SCS
SE-DSR-02494	Silver data centre	Bern		640 BEI	4736	SCS
SE-DSR-02471	Silver data centre	Bern		640 BEM	1024	SCS
SE-DSR-02499	Platinum data centre	Bern		640 BEW	5736	SCS
SE-DSR-02488	Silver data centre	Breganzona		630 LGV	1369	SCS
SE-DSR-02472	Silver data centre	Chur		660 CRG	1040	SCS
SE-DSR-02496	Silver data centre	Chur		660 CRS	5087	SCS
SE-DSR-02481	Silver data centre	Geneva		680 GEB	1091	SCS
SE-DSR-02480	Silver data centre	Geneva		680 GEM	1090	SCS
SE-DSR-02491	Gold data centre	Lausanne		690 LSS	1662	SCS
SE-DSR-02492	Silver data centre	Lausanne		690 LSP	1663	SCS
SE-DSR-02467	Silver data centre	Lucerne		710 LZW	1015	SCS
SE-DSR-02465	Silver data centre	Lucerne		710 LZF	1013	SCS
SE-DSR-02498	Platinum data centre	Münchenbuchsee		640 ZOI	5470	SCS
SE-DSR-02485	Silver data centre	St. Gallen		750 SGL	1256	SCS
SE-DSR-02473	Gold data centre	Olten		730 NAR	1064	SCS
SE-DSR-02486	Silver data centre	Wil		750 WIL	1261	SCS

² Regarding the organisation of the object classification, see 2.1

Doc. ID:	Object type:	City:	Address:	3BC:	WE:	BI:
SE-DSR-02483	Gold data centre	Zurich		790 ZHB	1120	SCS
SE-DSR-02484	Gold data centre	Zurich		790 ZHH	1139	SCS
SE-DSR-02482	Silver data centre	Zurich		790 ZHE	1110	SCS

Table 1.4.1: Electrical safety concepts for objects of type A

1.4.1.1 Electrical safety concepts for objects (object classification³ type B drawing power from network level 5)

Doc. ID:	Object type:	City:	Address:	3BC:	WE:	BI:
SE-DSR-02495	Business park	Bern			4752	SCS
SE-DSR-02478	Office building	Fribourg			1086	SCS
SE-DSR-02490	Central Office Bronze	Geneva		680 PPL	1575	SCS
SE-DSR-02476	Central Office Bronze	Lausanne		690 STF	1075	SCS
SE-DSR-02489	Central Office Bronze	Liestal		620 LIR	1532	SCS
SE-DSR-02497	Central Office Bronze	Sargans		660 SAR	5114	SCS
SE-DSR-02469	Business park	Olten			1019	SCS
SE-DSR-02487	Central Office Bronze	Winterthur		780 WIN	1307	SCS
SE-DSR-02463	Business park	Worblaufen			1009	SCS
SE-DSR-02479	Office building	Villars-sur-Glâne			1088	SCS

Table 1.4.2: Electrical safety concepts for objects of type B

1.4.2 Electrical safety concepts for objects (object classification³ type C drawing power from network level 5)

Doc. ID:	Object type:	City:	Designation:	4BC:	BI:
SE-DSR-02527	Broadcasting transmission installation	Andeer	MZA Rofla	RFLA	SBC
SE-DSR-02512	Broadcasting transmission installation	Arosa	MZA Aroser Weisshorn	AWRT	SBC

³ Regarding the organisation of the object classification, see 2.1

Doc. ID:	Object type:	City:	Designation:	4BC:	Bl:
SE-DSR-02515	Broadcasting transmission installation	Bettingen	MZA St. Chrischona	CHRI	SBC
SE-DSR-02513	Broadcasting transmission installation	Bolligen	MZA Bantiger	BNTG	SBC
SE-DSR-02524	Broadcasting transmission installation	Bourrignon	MZA Les Ordots	ORDS	SBC
SE-DSR-02523	Broadcasting transmission installation	Faido	MZA Pizzo Matro	MTRO	SBC
SE-DSR-02529	Broadcasting transmission installation	Flurlingen	MZA Schaffhausen Kohlfist	SHAF	SBC
SE-DSR-02533	Broadcasting transmission installation	Grüsch	MZA Valzeina Mittagsplatte	VZNA	SBC
SE-DSR-02516	Broadcasting transmission installation	Guttet-Feschel	MZA Feschel	FESL	SBC
SE-DSR-02522	Broadcasting transmission installation	Isonne	MZA Monte Ceneri CIMA	MCEC	SBC
SE-DSR-02532	Broadcasting transmission installation	Köniz	MZA Ulmizberg	ULMI	SBC
SE-DSR-02525	Broadcasting transmission installation	Maggia	MZA Pizzo Castello	PCST	SBC
SE-DSR-02531	Broadcasting transmission installation	Monte-ceneri	MZA Monte Tamaro	TAMO	SBC
SE-DSR-02520	Broadcasting transmission installation	Nendaz	MZA Haute-Nendaz	HTNE	SBC
SE-DSR-02514	Broadcasting transmission installation	Nods	MZA Chasseral	CHAS	SBC
SE-DSR-02519	Broadcasting transmission installation	San Vittore	MZA Giova	GOVA	SBC

Doc. ID:	Object type:	City:	Designation:	4BC:	Bl:
SE-DSR-02511	Broadcasting transmission installation	Stallikon	MZA Albis	ALBS	SBC
SE-DSR-02528	Broadcasting transmission installation	Urnäsch	MZA Säntis	SAEN	SBC
SE-DSR-02534	Broadcasting transmission installation	Wattwil	MZA Wattwil Chapf	WTTL	SBC
SE-DSR-02530	Broadcasting transmission installation	Wildhaus-Alt St. Johann	MZA Strichboden	STBO	SBC
SE-DSR-02535	Broadcasting transmission installation	Zernez	MZA Zernez	ZERN	SBC
SE-DSR-02536	Broadcasting transmission installation	Ziefen	MZA Ziefen Chöpfli	ZIEF	SBC

Table 1.4.3: Electrical safety concepts for objects of type C

1.4.3 Electrical safety concepts for object groups (drawing power from network level 7)

Doc. ID:	Object type:	Object classification ⁴ :	Number of objects ⁵ :	BI:
SE-DSR-02410	Central Office ⁶	Type B	985	SCS
SE-DSR-02411	Office building ⁶	Type B	86	SCS
SE-DSR-02412	Local Office IIP	Type C	2200	SCS
SE-DSR-02413	Local Office WAR	Type C	4800	SCS
SE-DSR-02414	Cellular base stations and antennas	Type C	8794	SCS
SE-DSR-02416	Shops	Type C	94	SCS
SE-DSR-02420	Broadcasting transmission installations ⁶	Type C	425	SBC
SE-DSR-02417	Other (pavilion, warehouse, residential buildings, car parks, stalls and other small objects < 25 m ²)	Type C	330	SIMAG

Table 1.4.4: Electrical safety concepts for object groups

⁴ Regarding the organisation of the object classification, see 2.1

⁵ Basis for number of objects: SIMAG database

⁶ Exception: Objects in the list of object-specific electrical safety concepts

1.5 Document hierarchy

The Security Policy Framework (SPF) of Swisscom AG covers the binding security and safety requirements and refers to possible solutions and ancillary documentation. These requirements establish a framework for safety. Requirements from laws, regulations and higher level standards (e.g. corporate governance) as well as requirements from the business strategy are taken into account here.

This electrical safety concept is integrated into the Security Policy Framework in domains 7 “People Management”, D07-3 “Security and Safety for People and Data” and is considered a low-level security requirement.

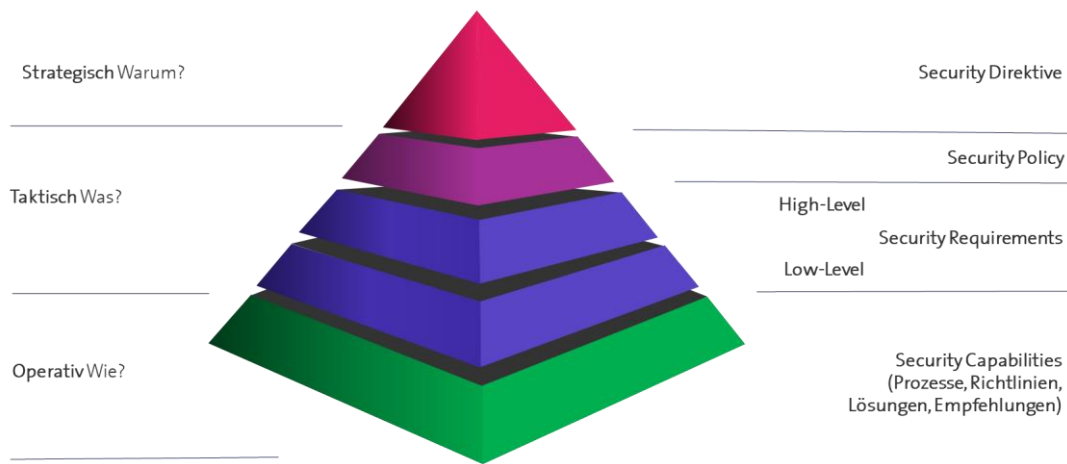


Chart 1.5: Hierarchical documents, “The foundation in hybrid environments and with decentralised developments”

The following documents are ranked at a higher level than the electrical safety concept (main document)⁷:

- International and national laws and ordinances;
- Accepted principles of engineering;
- Security Directive Swisscom AG;
- Security Policy Swisscom AG;
- Object-Specific Electrical Safety Concept Swisscom AG;
- Object Groups Electrical Safety Concept Swisscom AG.

⁷ Higher level documents may not diminish the content of the electrical safety concept. In case of doubt, contact the electrical safety officer.

1.6 Abbreviations and pictograms

1.6.1 Abbreviations

The abbreviations used in the document are explained below.

Abbreviation	Explanation
General	
3BC	Three letter code
4BC	Four letter code
ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
E+E	Examples and explanations
EKAS	Federal Coordination Commission for Occupational Safety FCOS
ES	Electrical energy source
ESTI	Federal Inspectorate for Heavy Current Installations ESTI
FM	Facility Management
GA	Basic training
Y	Year
NA	Not applicable
PS	Power source
SC	Swisscom AG
SBC	Swisscom Broadcast AG
SCS	Swisscom (Schweiz) AG
SIA	Swiss Society of Engineers and Architects
SIMAG	Swisscom Immobilien AG
SR	Systematic collection of laws
SUVA	Swiss Accident Insurance Fund
T	Tag
ULL	Unbundled Local Loop
VNB	Distribution network operator
WE	Business entity
X	Placeholder for a capital letter or a digit of a subchapter or section
x	Placeholder for a lower case letter of a subchapter or section
Documents	
AA	Work application
FAV	Ordinance on Telecommunications Installations
IA	Installation notification
KB	Inspection report
MP	Measurement report
MPP	Measurement and testing report
NEV	Ordinance on Electrical Low-Voltage Products
NIV	Ordinance on Low Voltage Installations
PG	Plan approval

Abbreviation	Explanation
PLPS	Protocol Lightning Protection System
RSD	Register safety dossier
SA	Switching order
SD	Safety dossier
SiNa	Safety record
SNP	Unit verification protocol
StV	Heavy Current Ordinance
TAB	Technical connection conditions of the distribution network operators
Functions	
AB	Person responsible for an electrical installation
AnV	Nominated person in control of an electrical installation during work activities
ArV	Nominated person in control of a work activity
BI	Proprietor
DBI	Third party proprietor
Work	
AK	Acceptance inspection
AuS	Live work
DE	Authorisation
EP	Initial inspection
FzA	Permission to start work
PK	Periodic inspection
PPE-E	Personal protective equipment against electrical hazards
SP	Spot check
SK	Final inspection
Equipment / installations / systems	
ACB	Air circuit breaker (open circuit breakers)
BAT	Battery
Fire alarm	Fire alarm system
EEA	Energy generation plant (diesel and gas generators; PV generators)
ESD	Electrostatic discharge
FMA	Telecommunications installation
gG	Whole-area cable and line protection
GLS	Building management system
HLKKS	Heating, ventilation, air-conditioning, refrigeration and sanitary systems
HV (MDF)	Main Distribution Frame (MDF)
ICS	Industry Control System
ICT	Information and Communications Technology
IP	Ingress Protection
ISLK	Information system line card index
mCan	Micro Copper Access Node

Abbreviation	Explanation
MCB	Miniature circuit breaker
MCCB	Moulded Case Circuit Breaker
NE	Network level
PUS	Primary transmission point
PRCD	Portable Residual Current operated Device
PDU	Power Distribution Unit
PV	Photovoltaic
RCD	residual current device
RPF	Remote Power Feeding
RPU	Remote Power Unit
RSV	Series feed distributor 48V DC
SCADA	Supervisory Control And Data Acquisition System
SGK	Switchgear combination
SRCD	Socket outlet residual current device
SVA	Power supply system 48 V DC
TS	Transformer Station
UPS	Uninterruptible power supply (static and dynamic)
VmRRU	Vault mounted Remote Radio Unit
WRI	Inverter telecommunications network
Emergency aid	
AED	Automated External Defibrillator
BLS	Basic Life Support
CPR	Cardiopulmonary Resuscitation
Voltages	
FELV	Functional Extra Low Voltage
PELV	Protective Extra Low Voltage
SELV	Safety Extra Low Voltage
V AC	Volts Alternating Current
V DC	Volts Direct Current

Table 1.6.1: Abbreviations

1.6.2 Pictograms

1.6.2.1 Normative pictograms



General warning symbol

As per EN 7010



Warning of electrical voltage

As per EN 7010



Warning of dangers from
charging of batteries

As per EN 7010



Warning of explosive
atmosphere

As per DIN 4844-2



Warning of hot surface

As per EN 7010



Open flame, fire, open source
of ignition and smoking
prohibited

As per EN 7010



Authorised access only

As per DIN 4844-2



Switching prohibited

As per EN 7010



Pull mains plug

As per EN 7010



Disconnect before
maintenance or repair

As per EN 7010

Table 1.6.2.1: Normative pictograms

1.6.2.2 Swisscom pictograms

	Additional Swisscom specification or term		
	Personal protective equipment against electrical hazards: fundamental protection		Disconnect, and disconnect on all sides
	Personal protective equipment against electrical hazards: Basic protection		Secure against re-connection
	Personal protective equipment against electrical hazards: High protection		Verify absence of operating voltage
	Personal protective equipment against electrical hazards: No verified protection possible		Earthing and short-circuiting
	Personal protective equipment against electrical hazards: As per tables A3.3.2.X		Protection against adjacent live parts

Table 1.6.2.1: Swisscom pictograms

1.7 Terms

Various terms used in this document are defined below. The primary source is EN 50110 [19], which in turn refers to various other documents.

Clear and uniformly defined terms are essential for ensuring that all participating functions (persons) understand the processes in the same way.

For other terms not defined here, please refer to the international glossary.⁸

This document uses masculine forms in a generic way to refer to all genders.

⁸ See online "Electropedia" or "Glossary" at www.iec.ch

1.7.1 General

1.7.1.1 Electrical installation

All the electrical equipment that is used for the generation, transmission, conversion, distribution and use of electrical energy.

NOTE on term: It includes energy sources such as batteries, capacitors and all other sources of stored electrical energy.

1.7.1.2 Heavy current installation [3]

According to Article 2 paragraph 2 of the Electricity Act: an electrical installation for generating, transforming, converting, conducting, distributing and using electricity operated with currents that endanger people or property or in which such currents could occur in the event of foreseeable malfunctions.

NOTE on term: For extra-low voltage as of an operating current greater than 2 amperes, if this installation does not endanger people or property. [6]

1.7.1.3 SC Complex installation

Installation for primary and secondary supply with transformer network level 6 or emergency power installation with automatic switchover and high-availability installations with multiple infeeds into the tertiary supply. ([E+E](#))

1.7.1.4 SC High-availability installation

Installation that guarantees the base supply for telecommunications traffic and data centres. The availability of these systems exceeds 99.75%. [21]

1.7.1.5 SC Infrastructure installations

Electrical installations of general infrastructure. ([E+E](#))

1.7.1.6 Telecommunications installations [10]

Devices, lines or equipment intended or used for telecommunications (transmission of information):

- 48 V DC installations;
- Installations with remote power feeding (e.g. remote power feeding ± 190 V DC).

1.7.1.7 Operating area of electrical installations [3]

Area of an electrical installation with elevated hazard.

(SC) These are areas or rooms containing one of the following installations:

- High voltage installations:
 - Transformers;
 - Distribution systems.

1.7.1.8 Electrical operating room [32]

Electrical operating rooms are rooms that are accessible only to instructed persons and skilled persons and contain primarily electrical equipment.

(SC) These are areas or rooms containing one of the following installations:

- Low and extra-low voltage installations of the primary and secondary supply:
 - Main distribution boards;
 - Substation of distribution circuits.
- Low and extra-low voltage installations of the tertiary supply:
 - Substation final circuits if the design is not suitable for ordinary persons (electrically) (not designed to EN 61439-3 or 61439-2 if the installation is not intended for ordinary person (electrically)).
- Generation and conversion equipment with short-circuit current ≥ 7 kA or back-up fuse ≥ 125 A or short-circuit energy ≥ 158 kJ:
 - Power supply systems;
 - Inverter telecommunications network installations;
 - Uninterruptible power supply installations;
 - Battery rooms > 60 V DC phase voltage;
 - NoBreak installations;
 - Energy generation plant.
- Operating systems, pilot and test installations of telecommunications installations without contact protection for ordinary persons:
 - Broadband laboratory.

NOTE 1 on term: In contrast to an operating area of electrical installations, an electrical operating room can dispense with the first aid information sign. In rooms or areas with main distribution boards of the primary supply, a corresponding first aid information sign must be posted.

NOTE 2 on term: First aid information signs with evaluation scheme GABI or older (SEV/Electrosuisse editions before 2000) must be replaced with new information signs using the action scheme ABC(DE). First aid information sign (SEV/Electrosuisse editions after 2000) with cardiopulmonary resuscitation in a rhythm of 15 compressions / 2 breaths must be changed to 30 compressions / 2 breaths (permanent text alteration or replacement possible). [41]

NOTE 3 on term: In electrical operating rooms with closed or sealed batteries, information signs with emergency call number and important information on conduct and aid measures in the event of accidents with batteries must be posted. [42]

NOTE 4 on term: Spatial separation of gas-tight battery installations is not necessary. The warning and prohibition signs for batteries are posted directly next to the battery installations. [1002]

NOTE 5 on term: Emergency lighting is required only in electrical operating rooms that are continuously operated and especially important. [32]

1.7.1.9 Battery room

A room in a building that is intended for housing stationary batteries. [24]

NOTE on term: In battery rooms with closed or sealed batteries, information signs with emergency call number and important information on conduct and aid measures in the event of accidents with batteries must be posted. [42]

1.7.1.10 SC Telecommunications installation operating room

Telecommunications installations operating rooms are rooms that are accessible only to instructed persons and skilled persons and contain primarily telecommunications equipment.

These are areas or rooms containing one of the following installations:

- Telecommunications installations
 - Transmission systems in the central office and local office;
 - Main distribution frames (MDF) with remote power feeding > 60 V DC;
 - Cellular base stations.

1.7.1.11 Primary distribution

Equipment for managing, controlling and converting incoming electrical energy supplies (primary, secondary and possibly additional supplies).

1.7.1.12 Secondary distribution

Equipment for managing, controlling and distributing the electrical energy provided by the primary distribution equipment for tertiary distribution with short-term emergency power, uninterruptible emergency power and general power.

1.7.1.13 Tertiary distribution

Distribution of electrical energy for final circuits with short-term emergency power, uninterruptible emergency power and general power.

1.7.1.14 Operation

All activities required so that the electrical installation can function.

NOTE on term: This includes switching, regulating, monitoring and maintenance as well as electrical and non-electrical work.

1.7.1.15 Electrical risk

Combination of the probability of occurrence and severity of a given type of damage.

1.7.1.16 Electrical danger

Source of possible injury or health impairment due to the presence of electrical energy in an installation

1.7.1.17 Injury (from electrical energy)

Death and injury of a person due to electric shock, burns, electric arc, fire or explosion, triggered by electrical energy and caused by operation of an electrical installation.

NOTE on term: (SC) This also includes secondary injuries caused by the consequences of an incident as described above.

1.7.1.18 (SC) Incident involving people that was caused by electricity [1006]

An incident caused by electricity in which no persons were injured.

NOTE 1 on term: Incidents could be, for instance, current flowing through a body without injury or an arcing fault without injury.

NOTE 2 on term: This also includes first degree burns caused by electrical current if the total skin area does not exceed 0.5 cm².

NOTE 3 on term: The observation time in the hospital following an incident may not exceed 24 hours.

NOTE 4 on term: A secondary accident not directly caused by electricity is considered an incident from the perspective of electrical safety.

1.7.1.19 (SC) Personal injury caused by electricity [1006]

Harm caused by electricity and resulting in injury to a person or persons.

NOTE on term: The harm could consist of injuries from current flowing through a body (blood poisoning, arrhythmia) or from an arcing fault (blinding, burns).

1.7.1.20 SC Significant property damage caused by electricity [1006]

Property damage caused by electricity, where damages are > CHF 50,000.

NOTE on term: Significant property damage could be caused by electrical fires, material defects or manipulation of operating equipment. In the case of repeated material defects, the total damage from all incidents attributable to the material defects is relevant.

1.7.1.21 Protection from energy sources [26]

Protective devices that reduce the likelihood of the occurrence of pain, injuries and, in the event of a fire, property damage.

NOTE on term: The protective equipment must be determined according to the groups of people (ordinary persons, instructed persons, skilled persons) and the energy source classification (class 1, class 2, class 3).

1.7.1.22 Protective devices against the entry of foreign bodies [26]

Openings of accessible enclosures located on the top or side must be arranged or executed such that the likelihood of a foreign body entering these openings is reduced to a minimum.

1.7.1.23 Energy management

Process for monitoring, analysing, reporting and improving the energy efficiency in high-availability installations. [23]

1.7.1.24 Secondary battery

Electrical energy source from two or more connected secondary cells. [25]

1.7.1.25 Closed (secondary) cell

Secondary cell with a cover that has an opening through which gaseous products can escape. [25]

1.7.1.26 Sealed (secondary) cell

Secondary cell that is sealed under normal conditions but is designed such that gas can escape if the internal pressure exceeds a defined value. The electrolyte in the cells normally cannot be topped up. [25]

1.7.1.27 Gas-tight (secondary) cell

Secondary cell that remains sealed and allows neither gas nor liquid to escape if operated within the limits specified by the manufacturer for charge and temperature. The cell can be equipped with a safety feature for avoiding dangerously high internal pressure. The cell does not require topping up of the electrolyte and is intended to operate in the original, gas-tight condition over its entire lifespan. [25]

1.7.1.28 Main distribution frame (MDF)

A main distribution frame is the central distribution component of the communication cabling of a building or property.

NOTE on term: This is used in the central office and local office for end customer copper connections and remote power feeding energy distribution.

1.7.1.29 ^{SC} Hybrid cable

Insulated cable consisting of insulated copper conductors and optical fibres that supplies remote units with energy via remote power feeding (≤ 60 V DC).

1.7.1.30 ^{SC} Day

With regard to required continuing education, a day is understood as subject-specific continuing education at the appropriate level with a minimum duration of 6 hours, excluding breaks or other interruptions.

NOTE on term: This formulation cannot be used for time tracking.

1.7.1.31 Third party lessee

From the perspective of Swisscom, a third party lessee is anyone who uses residential or business space as a lessee of a lessor. A direct contractual relationship exists between the third party lessee and the lessor.

NOTE on term: Companies in which Swisscom holds a majority stake are not considered third party lessees.

1.7.1.32 Sublessee

A sublessee is anyone who uses residential or business space as a lessee of a main lessee. A contractual relationship exists between the sublessee and the main lessee. No direct contractual relationship exists between the sublessee and the lessor.

1.7.2 Personnel, organisation and communication

1.7.2.1 Person responsible for an electrical installation

Nominated person with the overall responsibility to ensure the safe operation of the electrical installation by setting rules and organisation or framework.

NOTE 1 on term: This person can be the owner, proprietor or a delegated person who carries out the duties of the proprietor.

NOTE 2 on term: Some of these duties can be delegated to others as required. For large or complex electrical installations or networks, the duties can be delegated for parts of the installations or the network.

1.7.2.1.1 (SC) Person responsible for an electrical installation of a high voltage distribution network

Person responsible for an electrical installation of the regional (public) high voltage distribution network.

NOTE on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation. The overall responsibility remains with the person responsible for an electrical installation of the high voltage distribution network.

1.7.2.1.2 (SC) Person responsible for an electrical installation of a high voltage site network

Person responsible for an electrical installation of the local (non-public) high voltage distribution network at a site.

NOTE on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation. The overall responsibility remains with the person responsible for an electrical installation of the high voltage site network.

1.7.2.1.3 (SC) Person responsible for an electrical installation of low and extra-low voltage infrastructure systems

Person responsible for an electrical installation of the low and extra-low voltage distribution network for infrastructure installations.

NOTE on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation. The overall responsibility remains with the person responsible for an electrical installation of the low and extra-low voltage infrastructure systems.

1.7.2.1.4 (SC) Person responsible for an electrical installation of low and extra-low voltage telecommunications installations

Person responsible for an electrical installation of the low and extra-low voltage distribution network for telecommunications installations.

NOTE on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation. The overall responsibility remains with the person responsible for an electrical installation of the low and extra-low voltage telecommunications installation.

1.7.2.1.5 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage infrastructure systems in the organisational unit

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for infrastructure installations within the organisational unit.

NOTE 1 on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

NOTE 2 on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation for object / object groups. The overall responsibility remains with the delegated person responsible for an electrical installation of low and extra-low voltage infrastructure systems in the organisational unit.

NOTE 3 on term: If necessary, some of the obligations arising from this responsibility can be assigned to the nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations at the FM provider. The overall responsibility remains with the delegated person responsible for an electrical installation of low and extra-low voltage infrastructure systems in the organisational unit.

1.7.2.1.6 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations in the organisational unit

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for telecommunications installations within the organisational unit.

NOTE 1 on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

NOTE 2 on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated person responsible for an electrical installation for object / object groups. The overall responsibility remains with the delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations in the organisational unit.

1.7.2.1.7 (SC) Delegated person responsible for an electrical installation of a high voltage site network for an object group

Delegated person responsible for an electrical installation of the local (non-public) high voltage distribution network at the site of an object group.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.1.8 (SC) Delegated person responsible for an electrical installation of a high voltage site network for an object

Delegated person responsible for an electrical installation of the local (non-public) high voltage distribution network at the site of an object.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.1.9 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for an object group

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for infrastructure systems within an object group.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.1.10 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for an object

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for infrastructure systems within an object.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.1.11 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations for an object group

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for telecommunications installations within an object group.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.1.12 (SC) Delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations for an object

Delegated person responsible for an electrical installation of the low and extra-low voltage distribution network for telecommunications installations within an object.

NOTE on term: Takes over the obligations of the person responsible for an electrical installation within his organisational unit.

1.7.2.2 Nominated person in control of an electrical installation during work activities

A person who is responsible during work activities for the safe operation of the electrical installation.

NOTE on term: This person has to judge the possible effects of the work activities on the electrical installation or parts of it which are in his responsibility and the effects of the electrical installation on persons carrying out the work activities. Some of these duties can be delegated to others as required.

1.7.2.2.1 (SC) Nominated person in control of an electrical installation during work activities of a high voltage distribution network

A person who is responsible during work activities for the safe operation of the electrical installation on high voltage installations of a distribution network.

1.7.2.2.2 (SC) Nominated person in control of an electrical installation during work activities of a high voltage site network

A person who is responsible during work activities for the safe operation of the electrical installation on high voltage installations of a site network.

1.7.2.2.3 (SC) Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installation at the FM provider

A person who is responsible during work activities for the safe operation of the electrical installation on low and extra-low voltage infrastructure installation.

NOTE 1 on term: This person is employed by the FM provider.

NOTE 2 on term: If necessary, some of the obligations arising from the responsibility of the delegated person responsible for an electrical installation can be assigned to the nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations at the FM provider.

1.7.2.2.4 (SC) Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations

A person who is responsible during work activities for the safe operation of the electrical installation on low and extra-low voltage infrastructure installation.

1.7.2.2.5 (SC) Nominated person in control of an electrical installation during work activities of low and extra-low voltage telecommunications installations

A person who is responsible during work activities for the safe operation of the electrical installation on low and extra-low voltage telecommunications installations.

1.7.2.3 Nominated person in control of a work activity

A person nominated with the ultimate responsibility for the work activity at work location.

NOTE on term: Some of these duties can be delegated to others as required.

1.7.2.4 Visitor

Persons who are neither instructed nor skilled (electrically) and who temporarily spend time in a heavy current installation.

1.7.2.5 Proprietor [3]

Responsible operator (owner, lessee, etc.) of an electrical installation.

See also 1.7.7.6.

1.7.2.5.1 (SC) Delegated proprietor in an organisational unit

Nominated responsible operator of the electrical installations within the organisational unit.

NOTE 1 on term: Takes over the obligations of the proprietor within his organisational unit.

NOTE 2 on term: If necessary, some of the obligations arising from this responsibility can be assigned to the delegated proprietor for object / object group. The overall responsibility remains with the delegated proprietor in the organisational unit.

1.7.2.5.2 (SC) Delegated proprietor for an object group

Nominated responsible operator of the electrical installations in an object group.

NOTE on term: Takes over the obligations of the proprietor within his object group.

1.7.2.5.3 (SC) Delegated proprietor for an object

Nominated responsible operator of the electrical installations in an object.

NOTE on term: Takes over the obligations of the proprietor within his objects.

1.7.2.6 (SC) Third party proprietor

Responsible operator (owner, lessee, etc.) of an electrical installation for which Swisscom AG does not have the function of proprietor. These are distribution network operators, customers, lessees of Swisscom AG as well as lessees and owners of objects on properties where Swisscom AG is proprietor of network level 6.

1.7.2.7 (SC) Electrical safety officer

The electrical safety officer supports the proprietor in all technical matters. He also defines the safety principles, rules and conditions of the organisation on behalf of the proprietor.

1.7.2.8 (SC) Electro Agent

The electro agent supports the nominated proprietor and the delegated person responsible for an electrical installation in all technical matters. He also defines the safety principles, rules and conditions of the organisation on behalf of the electrical safety officer.

1.7.2.9 Skilled person (electrically)

A person with relevant education, knowledge and experience to enable him or her to analyse risks and to avoid hazards which electricity could create. A skilled person corresponds to an expert as per Art. 3 paragraph 23 StV.

1.7.2.10 (SC) Skilled person for low and extra-low voltage

A person with appropriate education, knowledge and experience to recognise and avoid dangers that can be posed by electricity in low and extra-low voltage energy distribution. A skilled person for low and extra-low voltage corresponds to an expert as per Art. 3 paragraph 23 StV with practical experience in low and extra-low voltage energy distribution.

1.7.2.11 (SC) Skilled person for high voltage

A person with appropriate education, knowledge and experience to recognise and avoid dangers that can be posed by electricity in high voltage energy distribution. A skilled person for high voltage corresponds to an expert as per Art. 3 paragraph 23 StV with practical experience in high voltage energy distribution.

1.7.2.12 (SC) Skilled person for inspection

A person with appropriate education, knowledge and experience to recognise and avoid dangers that can be posed by electricity during low voltage inspections. A skilled person for inspection corresponds to an expert as per Art. 3 paragraph 23 StV with practical experience in electrical inspections.

NOTE on term: The condition of appropriate education is satisfied by expert status as per Art. 8 NIV, professional examination as electrical inspector/chief fitter, electrical safety consultant or installation and safety electrical project manager.

1.7.2.13 (SC) Skilled person for the inspection of high-availability installations

A person with appropriate education, knowledge and experience to recognise and avoid dangers that can be posed by electricity during low voltage inspections. A skilled person for the inspection for high-availability installations corresponds to an expert as per Art. 3 paragraph 23 StV with practical experience in electrical inspections.

NOTE 1 on term: The condition of appropriate education is satisfied by expert status as per Art. 8 NIV or an equivalent education.

NOTE 2 on term: The practical experience in high-availability installations should amount to at least 3 years.

1.7.2.14 (SC) Authorised skilled person (electrically)

A person with relevant technical education, knowledge and experience to enable him or her to analyse risks and to avoid hazards which electricity could create. An authorised skilled person (electrically) corresponds to an expert as per Art. 3 paragraph 23 StV with the following additional requirements:

- Knowledge of the operating condition of the electrical installation;
- Ability to assess the impact of planned work on the safe operation of the specific installation;
- Ability to identify the particular dangers present during work on or in the vicinity of electrical installations.

1.7.2.15 Instructed person

A person adequately advised by a skilled person to enable him or her to avoid dangers which electricity may create.

1.7.2.16 Informed person [3]

This term should not be used; see instructed person.

1.7.2.17 Ordinary person (electrically)

A person who is neither a skilled person nor an instructed person.

1.7.2.18 Expert [3]

This term should not be used; see skilled person (electrically).

1.7.2.19 Authorised switching technician

Skilled person or instructed person who knows the corresponding switching or work order and acts accordingly.

NOTE 1 on term: For high voltage installations, the course “Authorised Switching Competence” is absolutely required.

NOTE 2 on term: (SC) Switching actions in the primary and secondary supply may only be carried out by persons designated in the authorisation matrix A3.2.X.

1.7.2.20 (SC) Swisscom AG project manager

Person who is an employee of Swisscom AG and manages projects with heating, ventilation, refrigeration, sanitary, IT, telecommunications or electrical installations.

1.7.2.21 (SC) Work application

Document containing the precise description of the work, the result of the risk assessment and, for complex installations, also the switching order.

1.7.2.22 (SC) Safety dossier

The safety dossier contains all documents attesting to the safety of the electrical installation. These include the safety record, measurement and testing report, measurement report, conformity declarations, (item and design verification).

1.7.2.23 (SC) NIV central office

Central office (internal or external) that archives the safety records as per Art. 5 NIV on behalf of the proprietor [6]. In objects for which Swisscom AG is site network operator, this function carries out the duties of the network operator. In addition, this office coordinates the independent inspection bodies for the periodic verifications and acceptance inspections.

1.7.3 Working zone

1.7.3.1 Work location

Site(s), place(s) or area(s) where a work activity is to be, is being, or has been carried out.

1.7.3.2 Live working zone

space around live parts in which the insulation level to prevent electrical danger is not assured when reaching into or entering it without protective measures.

NOTE on term: The outer limit of the live working zone is denoted as the distance D_L (see A2.5.3.1).

1.7.3.3 Vicinity zone

Limited space outside the live working zone.

NOTE on term: The outer limit of the vicinity zone is denoted as the distance D_V (see A2.5.3.1).

1.7.4 Working

1.7.4.1 Work activity

Any form of electrical or non-electrical work where there is the possibility of an electrical hazard.

1.7.4.2 Simple work

Dead working and live working 1 on low voltage final circuits up to 32 amperes and extra-low voltage final circuits up to 63 amperes. Oral authorisation from the nominated person in control of an electrical installation during work activities is required to perform simple work.

1.7.4.3 Use

Operation of an installation from a safe location using the devices designed for this purpose that can be used safely without further preventive measures is not considered work on a heavy current installation.

1.7.4.4 Electrical work

Work on, with or near an electrical installation such as testing and measurement, repairing, replacing, modifying, extending, erecting, maintaining and inspecting.

1.7.4.5 Non-electrical work

Work near to an electrical installation such as construction, excavation, cleaning, painting, etc.

1.7.4.6 Live working [40]

All work in which a person deliberately makes contact with live parts or reaches into the live working zone with either parts of his or her body or with tools, equipment or devices being handled.

1.7.4.6.1 Live working 1 [3][40]

- a. Work on heavy current installations with an alternating voltage below 50 V or direct current below 60 V;
- b. Work on control and measurement circuits;
- c. Simple, routine work like:
 - Inspection;
 - Measurement;
 - Cleaning;
 - Attaching or removing barriers and the like with possible entry into the live working zone.

1.7.4.6.2 Live working 2 [40]

Work that poses special requirements on the personnel, their education and the organisation:

- Knowing, intentional work in the live working zone;
- Work on company-owned measurement and control lines as well as measurement circuits if accidental, unintended entry into the live working zone cannot be ruled out;
- Work in the vicinity zone without a barrier and if accidental, unintended entry into the live working zone cannot be ruled out.

1.7.4.7 Work in the vicinity of live parts

all work activity in which a worker with part of his or her body, with a tool or with any other object enters into the vicinity zone without encroaching into the live working zone.

1.7.4.8 Isolate

disconnect completely a device or circuit from other devices and circuits by creating a physical separation able to withstand the anticipated voltage differences between the device or circuit and other circuits.

1.7.4.9 Switching operation

Disconnecting or re-connecting installations in connection with work activities.

1.7.4.10 Switching instruction authorisation [37]

The switching instruction authorisation entitles a person to issue instructions for operating activities within a clearly defined area. The authorised person is responsible for the operating activities he initiates.

1.7.4.11 Dead

Electrical potential corresponding to that of the earth at the work location or differing only negligibly from this.

1.7.4.12 Dead working

work activity on electrical installations, which are neither live nor charged, carried out after having taken all measures to prevent electrical danger.

1.7.4.13 SC Formal approval

Formal permission to carry out the planned work (clear written or oral instruction). ([E+E](#))

1.7.4.14 Authorisation

Formal approval to carry out the planned work (clear written or oral instruction). ([E+E](#))

1.7.4.15 Permission to start work

Direct instruction to the workers at work location to commence work after all safety measures are taken. ([E+E](#))

1.7.5 Protective devices

1.7.5.1 (SC) Personal protective equipment against electrical hazards

Serves for protection against electrical current flowing through the body and/or against the effects of arcing faults.

It must be used during all work that by its nature could cause injuries or health impairments that cannot be prevented by other measures (technical or organisational).

NOTE on term: Must correspond to EN 61482.

1.7.5.2 Screen

Any device, which may be insulated or not, which is used to prevent approach to any equipment or part of electrical installation which presents electrical danger.

1.7.5.3 Barrier

A part providing protection against direct contact from any usual direction of access.

1.7.5.4 Insulating covering

A rigid or flexible cover made of insulating material used to cover live and/or unenergised parts and/or adjacent parts in order to prevent accidental contact.

NOTE on term: Only tested insulating covering rated for at least 1000 V AC or 1500 V DC may be used.

1.7.5.5 Enclosure

A part providing protection of equipment against certain external influences and, in any direction, protection against direct contact.

1.7.6 Nominal voltages

1.7.6.1 Extra-low voltage

Less than or equal to 50 V alternating current (AC) or 120 V harmonic-free direct current (DC) between conductors or against earth; this includes SELV, PELV and FELV.

1.7.6.2 Low voltage

Less than or equal to 1000 V AC or 1500 V DC.

1.7.6.3 High voltage

Greater than 1000 V AC or 1500 V DC.

1.7.6.4 Network level 5

Regional distribution network. Areas with voltage from 1 kV to 36 kV.

1.7.6.5 Network level 6

Transformer level. Transforms the current to the next lower level (or higher, if necessary).

1.7.6.6 Network level 7

Local distribution network. Everything below 1 kV is referred to as the low voltage level. Electricity reaches household sockets at this voltage level.

1.7.7 SC **Ownership and possession**

1.7.7.1 Ownership

Ownership refers to the most comprehensive form of control over property supported by law. Features of modern forms of ownership include the legal assignment of goods to a natural or legal person, recognition of the owner's arbitrary power of disposal and restriction of the owner's discretion by law. Most constitutions protect ownership as a basic right but do not provide a clear definition.

1.7.7.2 Possession

In legal language, possession refers to the actual control over property. In other words, "possession" means that someone actually has the property at their disposal and under their power. This applies regardless of whether or not they own the property, such as even if the property is leased or illegally obtained.

1.7.7.3 Real estate owner

The real estate owner is generally the person registered in the land register. [\(E+E\)](#)

1.7.7.4 Real estate possessor

The possessor of the real estate (or a portion of the real estate) is the person who has the right to control access (owner or lessee). [\(E+E\)](#)

1.7.7.5 Electrical installation owner

The electrical installation owner is the person who financed the electrical installations. [\(E+E\)](#)

1.7.7.6 Electrical installation proprietor

The proprietor (possessor) of an electrical installation is the person who has the right to control access. [\(E+E\)](#)

Concerning responsibility, see 1.7.2.5.

1.8 Referenced documents

The documents listed below are the ones that have definitive influence on the electrical safety concept. The implementation of the processes is governed by all laws, ordinances, standards, instructions and the like that can be understood as the state of the art.

The user must always ensure that the current documents are used. Any exceptions are specially indicated. Where possible, links to the documents are provided to allow for quick access. The links were created and checked with great care; they are checked and modified upon every document revision. Nevertheless, it is possible that, over time, the links may no longer refer to the desired document. In this case, it is simplest to search for the current document by name (in a search engine).

1.8.1 Referenced documents (normative)

- [1] [Federal Act on Electrical Weak and Heavy Current Installations \[Bundesgesetz betreffend die elektrischen Schwach- und Starkstromanlagen\] \(EleG\), SR 734.0](#)
- [2] [Ordinance on Electrical Weak Current Installations \(Weak Current Ordinance\) \[Verordnung über elektrische Schwachstromanlagen\], SR 734.1](#)
- [3] [Ordinance on Electrical Heavy Current Installations \(Heavy Current Ordinance\) \[Verordnung über elektrische Starkstromanlagen\], SR 734.2](#)
- [4] [Ordinance on Planning Permission Procedures for Electrical Installations \(VPEA\) \[Verordnung über das Plangenehmigungsverfahren für elektrische Anlagen\], SR 734.25](#)
- [5] [Ordinance on Electrical Low-Voltage Products \(NEV\) \[Verordnung über elektrische Niederspannungserzeugnisse\], SR 734.26](#)
- [6] [Ordinance on Electrical Low-Voltage Installations \(NIV\) \[Verordnung über elektrische Niederspannungsinstallationen\], SR 734.27](#)
- [7] [Ordinance of UVEK on Electrical Low-Voltage Installations \[Verordnung des UVEK über elektrische Niederspannungsinstallationen\], SR 734.272.3](#)
- [8] [Ordinance on Electrical Lines \[Verordnung über elektrische Leitungen\] \(LEV\); SR 734.31](#)
- [9] [Ordinance on Electromagnetic Compatibility \(OEMC\), SR 734.5](#)
- [10] [Telecommunications Act \(TCA\), SR 784.10](#)
- [11] [Ordinance on Telecommunications Installations \(FAV\), SR 784.101.2](#)
- [12] [Federal Act on Labour in Industry, Commerce and Trade \[Bundesgesetz über die Arbeit in Industrie, Gewerbe und Handel\] \(ArG\), SR 822.11](#)
- [13] [Ordinance 3 on the Labour Act \[Verordnung 3 zum Arbeitsgesetz\] \(ArGV 3\), SR 822.113](#)
- [14] [Instruction on Ordinance 3 on the Labour Act \[Wegleitung zur Verordnung 3 zum Arbeitsgesetz\], Art. 36, SR 822.113](#)
- [15] [Federal Act on Accident Insurance \[Bundesgesetz über die Unfallversicherung\] \(UVG\), SR 832.20](#)
- [16] [Ordinance on Accident Insurance \[Verordnung über die Unfallversicherung\] \(UVV\), SR 832.202](#)

- [17] [Ordinance on Preventing Accidents and Occupational Illnesses \[Verordnung über die Verhütung von Unfällen und Berufskrankheiten\] \(VUV\), SR 832.30](#)
- [18] [Federal Act on Product Safety \[Bundesgesetz über die Produktesicherheit\] \(PrSG\), SR 930.11](#)
- [19] Operation of electrical installations – Part 1: General requirements, EN 50110-1
- [20] Erection and operation of electrical test equipment, EN 50191
- [21] Information technology - Data centre facilities and infrastructures - Part 1: General concepts, EN 50600-1
- [22] Information technology - Data centre facilities and infrastructures - Part 2-2: Power supply and distribution, EN 50600-2-2
- [23] Information technology - Data centre facilities and infrastructures - Part 3-1: Management and operational information, EN 50600-3-1
- [24] Safety requirements for secondary batteries and battery installations - Part 1: General safety information, EN 62485-1
- [25] Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries, EN 62485-2
- [26] Audio/video, information and communication technology equipment - Part 1: Safety requirements, EN 62368-1
- [27] Information technology equipment - Safety - Part 21: Remote power feeding, EN 60950-21
- [28] Information technology equipment - Safety - Part 22: Equipment to be installed outdoors, EN 60950-22
- [29] Protection of electronic devices from electrostatic phenomena - Part 5-1: General requirements, EN61340-5-1
- [30] [Environmental Engineering \(EE\); Powering of equipment in access network, ETSI EN 302 099](#)
- [31] [Remote Power Feeding Installations, Safety, ETSI EN 302 999](#)
- [32] Low Voltage Installations Standard, SN 411000
- [33] Lightning Protection Systems, SNR 464022
- [34] Foundation Earth Electrodes, SNR 464113
- [35] Earthing as a Preventive Measure in Electrical Heavy Current Installations, SNG 483755 [Erden als Schutzmassnahme in elektrischen Starkstromanlagen]
- [36] Recurrent Test and Test after Repair of Electrical Equipment, SNR 462638
- [37] [Terms, Switching Orders and Work Orders, ESTI No. 100 \[Begriffe, Schalt- und Arbeitsaufträge, ESTI Nr. 100\]](#)
- [38] [Monitoring of Public Lighting Systems, ESTI No. 244 \[Kontrolle von öffentlichen Beleuchtungsanlagen, ESTI Nr. 244\]](#)

- [39] [Principles for Switching Operations after Tripping of High Voltage Lines, ESTI No. 247 \[Grundsätze für Schaltungen nach Auslösung von Hochspannungsleitungen, ESTI Nr. 247\]](#)
- [40] [Activities on electrical installations, ESTI No. 407 \[Tätigkeiten an elektrischen Anlagen, ESTI Nr. 407\]](#)
- [41] [ESTI Notice “First Aid after Electrical Accidents” \[ESTI Mitteilung “Erste Hilfe bei Elektrounfällen”\]](#)
- [42] [Acids and Alkalis, EKAS 6501 \[Säuren und Laugen, EKAS 6501\]](#)
- [43] [Guideline for Inclusion of Occupational Physicians and Other Specialists in Work Safety \(ASA Guideline\), EKAS 6508 \[Richtlinie über den Beizug von Arbeitsärzten und anderen Spezialisten der Arbeitssicherheit \(ASA-Richtlinie\), EKAS 6508\]](#)
- [44] [5 + 5 Vital Rules when Handling Electricity, SUVA 84042](#)
- [45] [Identifying and Evaluating Asbestos and Acting Correctly, SUVA 88254 \[Asbest erkennen, beurteilen und richtig handeln, SUVA 88254\]](#)
- [46] [Guideline for Evaluating the Competence of Electrically Skilled Persons, IVSS 004d](#)
- [47] [Fire Protection Guideline for Fire Fighting Equipment, VKF 18-15 \[Brandschutzrichtlinie Löscheinrichtungen, VKF 18-15\]](#)
- [48] Technical connection conditions of the distribution network operators

1.8.2 Referenced documents (Swisscom)

- [100] Cyber Security: The Current Threat Landscape and Its Development; August 2015 [Cyber Security: die aktuelle Bedrohungslage und ihre Entwicklung; Ausgabe August 2015]
- [101] SE-00668-C2 Implementation Rules for Remote Access [SE-00668-C2-Ausführungsbestimmungen-Remote-Access]
- [102] ESD Directive
- [103] SE-DSR-02550 Guideline for Verifying the Safety of Electrical Installations [SE-DSR-02550 Guideline Nachweis der Sicherheit von Elektroanlagen]
- [1000] ESTI Permit – Installation and inspection with 48-V DC Source 2016-06-24 [Bewilligung ESTI Installation und Kontrolle mit 48-V DC Quelle 2016-06-24]
- [1001] ESTI Permit - Interface NIV-NEV - Battery Installations 2016-06-24 [Bewilligung ESTI Schnittstelle NIV-NEV Batterieanlagen 2016-06-24]
- [1002] Electrosuisse Permit - Detailed Specification of Battery Installations 2017-08-15 [Bewilligung Electrosuisse Präzisierungen Batterieanlagen 2017-08-15]
- [1003] ESTI Permit - Detailed Specification of Telecommunications Installations 2018-02-02 [Bewilligung ESTI Präzisierungen Fernmeldeanlagen 2018-02-02]
- [1004] ESTI Permit - Detailed Specification of Cabinet Exteriors 2018-02-02 [Bewilligung ESTI Präzisierungen Kabinen Aussen 2018-02-02]
- [1005] ESTI Meeting Report [Besprechungsbericht] 06 2018-04-04
- [1006] ESTI Meeting Report [Besprechungsbericht] 07 2018-08-24

2 General safety principles

2.1 Organisation

The organisation for installations falling within the area of application of this electrical safety concept must be applied to the objects and systems in a situation-specific way. Table 2.1a refers to the situation-specific organisation application scheme from sections 2.1.1.X to 2.1.2.X:

		Operating organisation of Swisscom			Operating organisation of third party proprietors and projects		
Installations Objects	Low and extra-low voltage Infrastructure installations	Low and extra-low voltage Telecommunications installations	High voltage installations	Low and extra-low voltage Infrastructure installations	Low and extra-low voltage Telecommunications installations	High voltage installations	
Swisscom (Schweiz) AG							
Type A	2.1.1.1	2.1.1.4	2.1.1.5	2.1.2.1	2.1.2.4	2.1.2.5	
Type B	2.1.1.2			2.1.2.2			
Type C	2.1.1.3			2.1.2.3			
Other group companies							
Type C	2.1.1.3	2.1.1.4	2.1.1.5	2.1.2.3	2.1.2.4	2.1.2.5	

Table 2.1a: Organisation application scheme

Key	
Type A	Data centres
Type B	Central office and office
Type C	Local office, cellular base stations and antennas, broadcasting transmission systems and other objects

Table 2.1b: Organisation application scheme key

To select the correct organisation application scheme, it is necessary to know the object type and the installations where the activities will be performed.

NOTE 1: For low and extra-low voltage infrastructure systems, the application scheme must be selected on an object-specific basis. In objects of type A, the application scheme 2.1.1.1 applies; in objects of type B, the application scheme 2.1.1.2 applies; and in objects of type C, application scheme 2.1.1.3 applies.

NOTE 2: For low and extra-low voltage telecommunications installations, application scheme 2.1.1.4 generally applies.

NOTE 3: For high voltage installations, application scheme 2.1.1.5 generally applies.

NOTE 4: For high, low and extra-low voltage installations of third party proprietors and for projects, application scheme 2.1.2.X applies.

2.1.1 Operating organisation of Swisscom

2.1.1.1 Low and extra-low voltage installations in data centres with FM provider

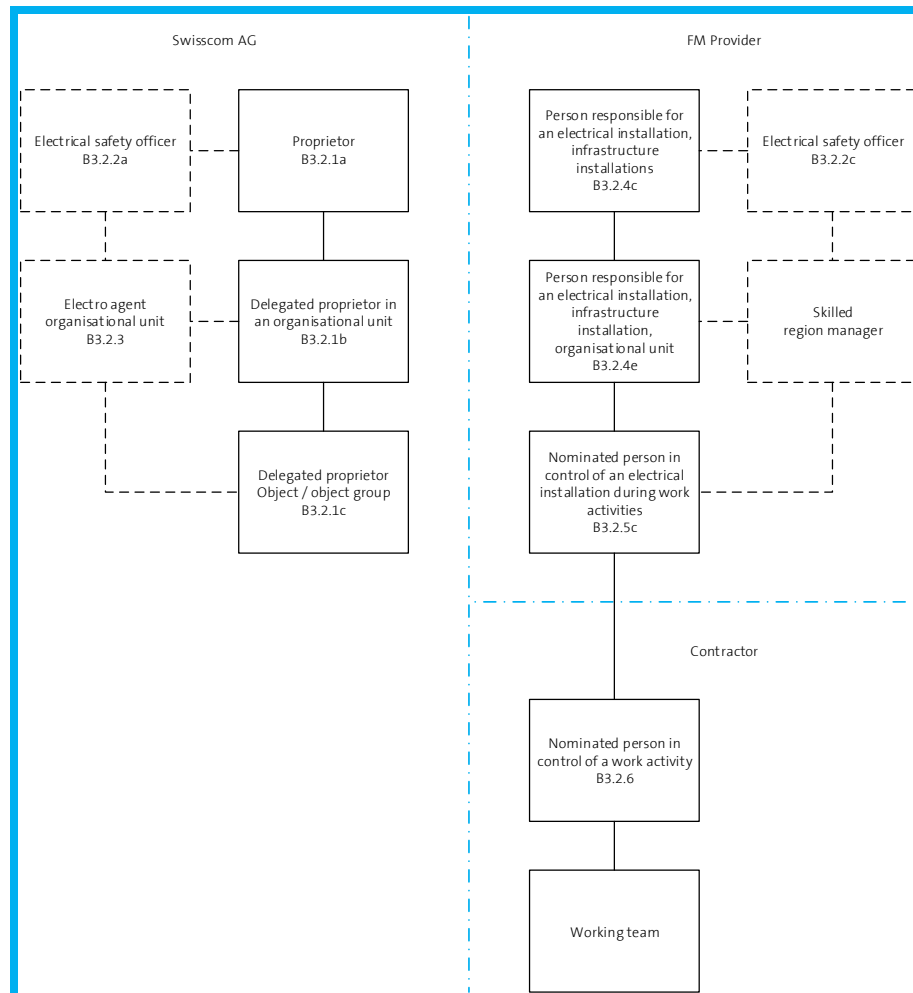


Chart 2.1.1.1: Organisation of low and extra-low voltage installations in data centres with FM provider

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise supporting functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietor must ensure that a corresponding partner function exists at the same level in the individual organisational units. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.1.2 Low and extra-low voltage infrastructure systems with FM provider

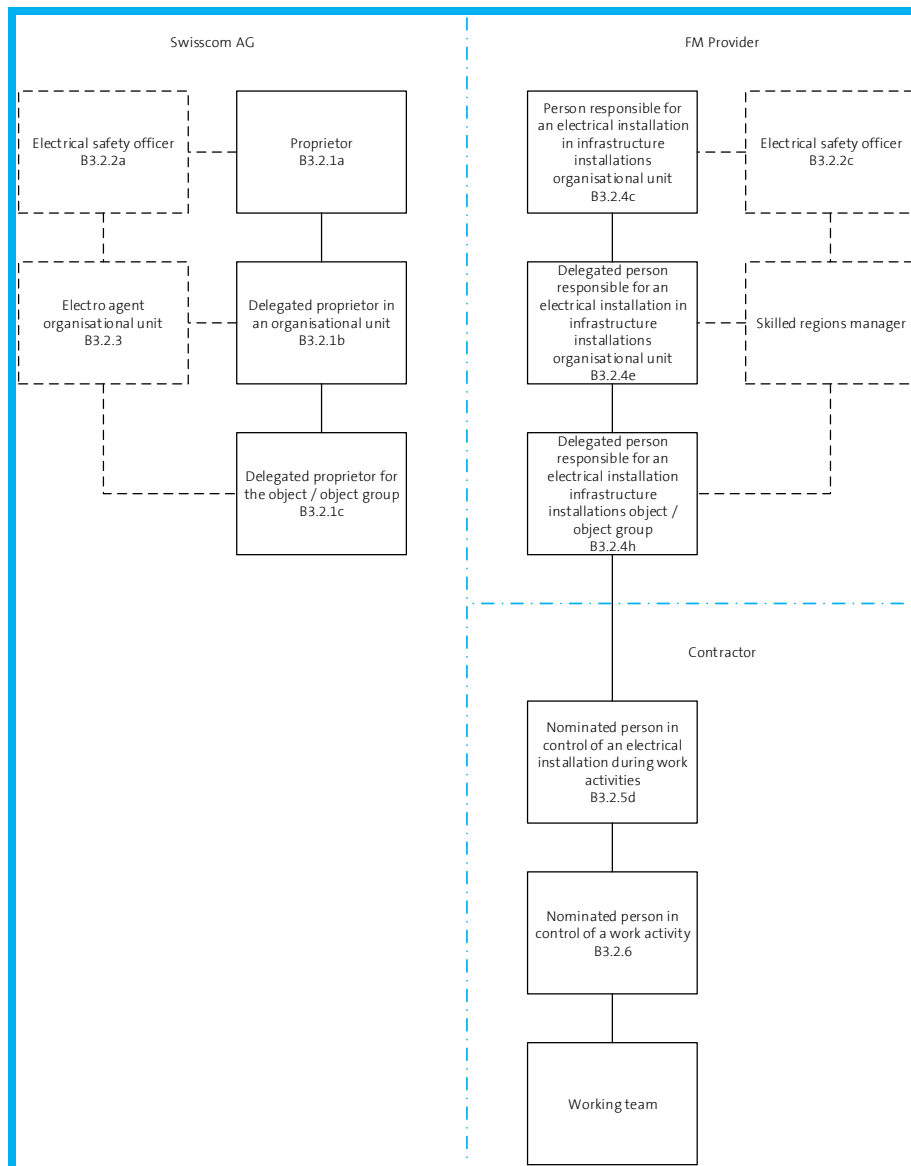


Chart 2.1.1.2: Organisation of low and extra-low voltage infrastructure systems with FM provider

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise supporting functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietor must ensure that a corresponding partner function exists at the same level in the individual organisational units. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.1.3 Low and extra-low voltage infrastructure systems without FM provider

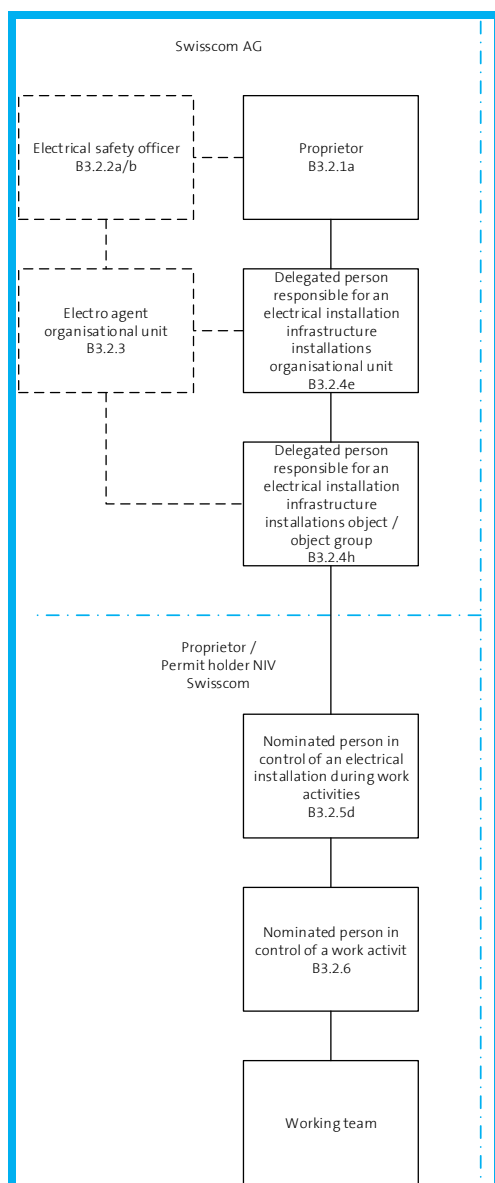


Chart 2.1.1.3: Organisation of low and extra-low voltage infrastructure systems without FM provider

NOTE: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise supporting functions.

2.1.1.4 Low and extra-low voltage telecommunications installations

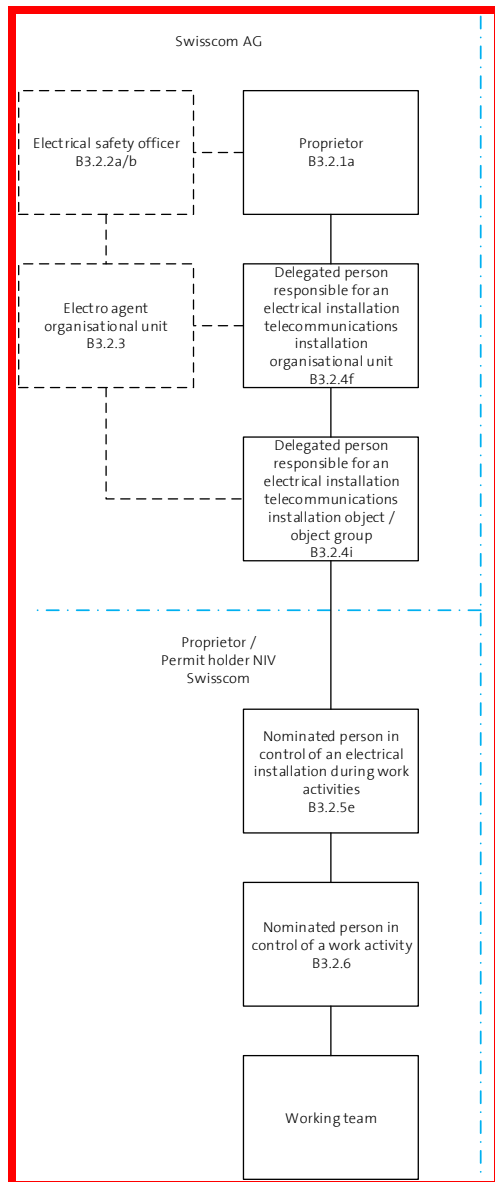


Chart 2.1.1.4: Organisation of low and extra-low voltage telecommunications installations

NOTE: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise supporting functions.

2.1.1.5 High voltage installation with contract partner site network

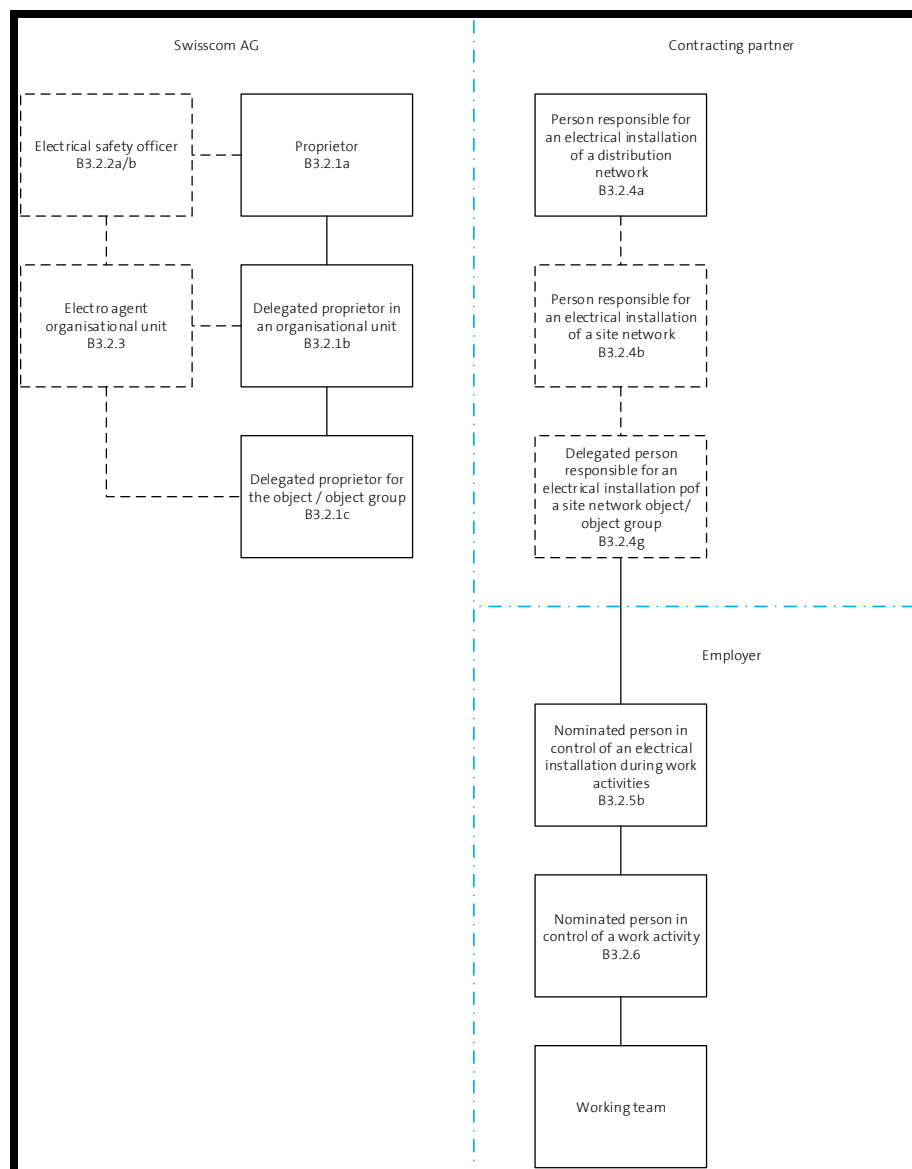


Chart 2.1.1.5: Organisation of high voltage installation with contracting partner

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise supporting and situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietor must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.2 Operating organisation of third party proprietors and projects

2.1.2.1 Low and extra-low voltage installations in data centres with FM provider

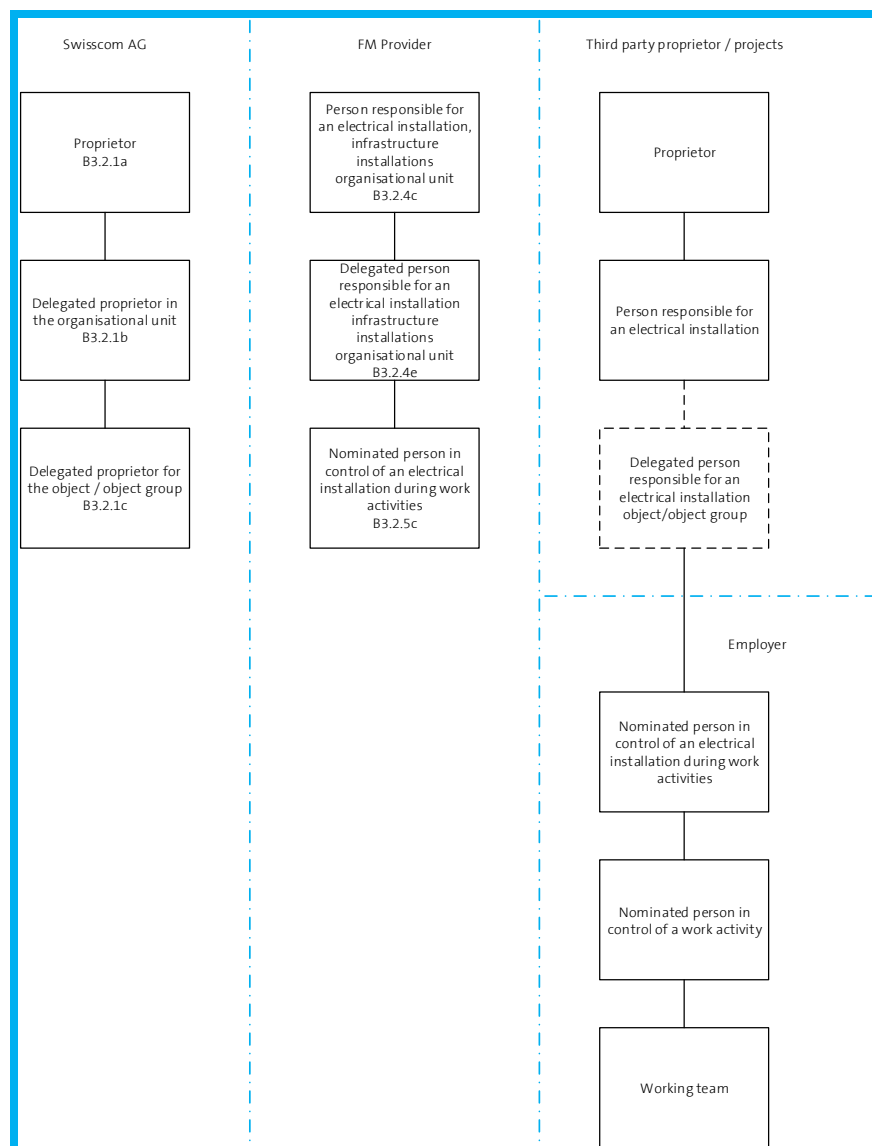


Chart 2.1.2.1: Organisation of third party proprietors and projects for low and extra-low voltage installations in data centres with FM provider

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise operational but situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietors must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.2.2 Low and extra-low voltage infrastructure systems with FM provider

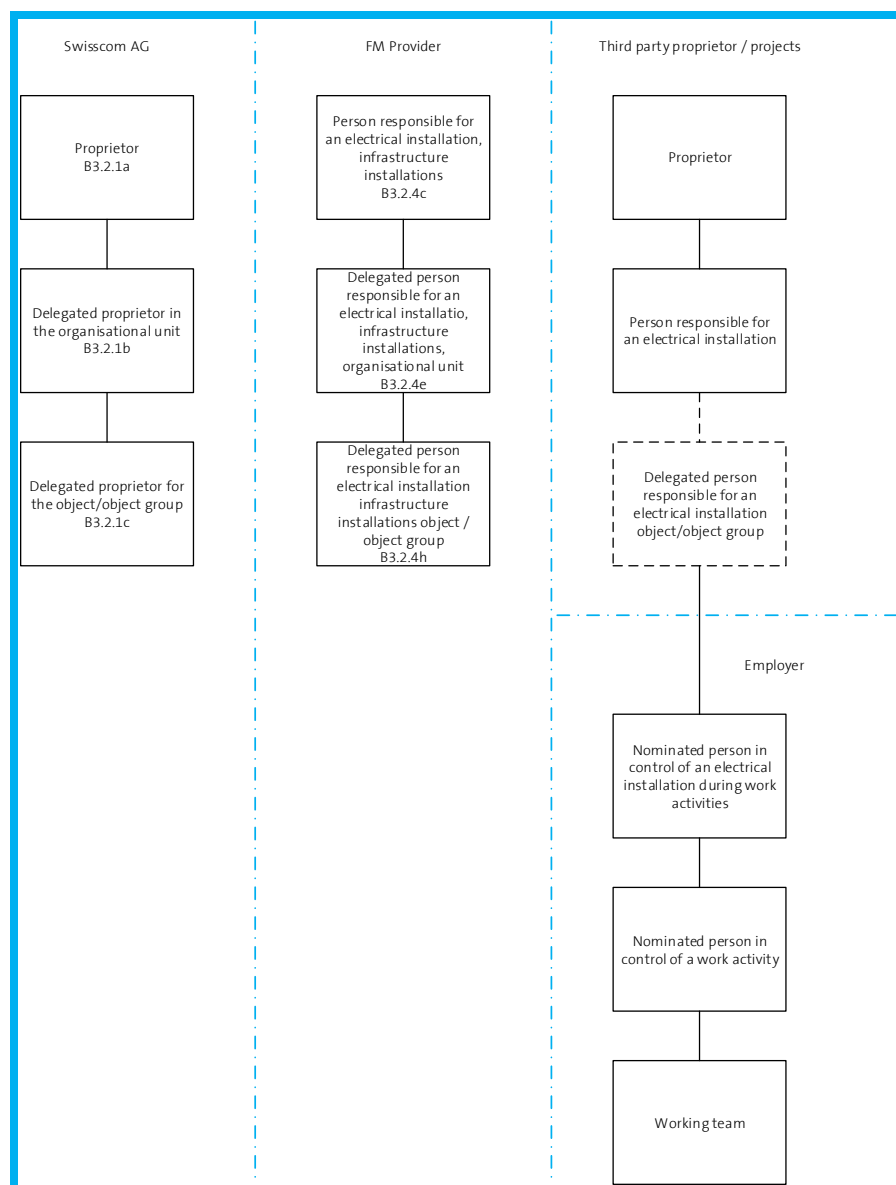


Chart 2.1.2.2: Organisation of third party proprietors and projects for low and extra-low voltage infrastructure systems with FM provider

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise operational but situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietors must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.2.3 Low and extra-low voltage infrastructure systems without FM provider

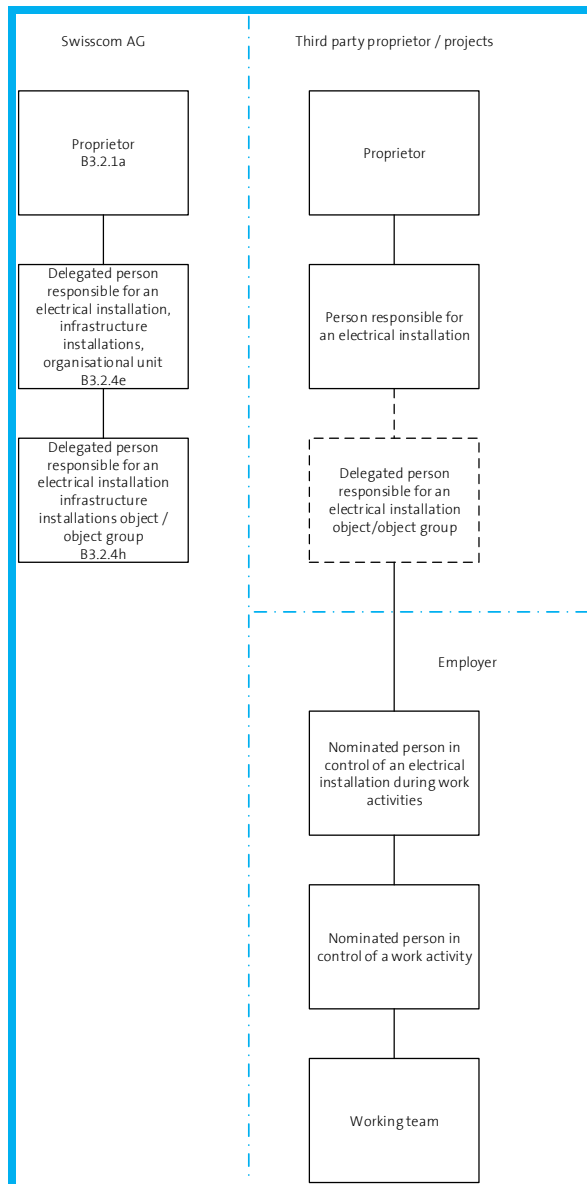


Chart 2.1.2.3: Organisation of third party proprietors and projects for low and extra-low voltage infrastructure systems without FM provider

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise operational but situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietors must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.2.4 Low and extra-low voltage telecommunications installations

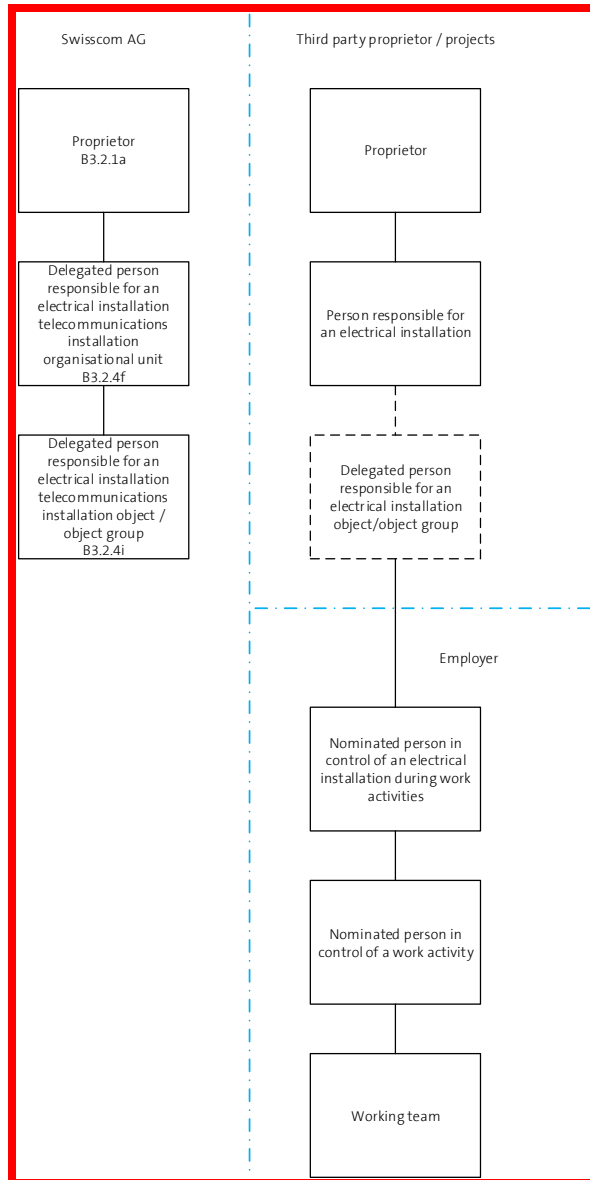


Chart 2.1.2.4: Organisation of third party proprietors and projects for low and extra-low voltage telecommunications installations

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise operational but situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietors must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.2.5 High voltage installation with contract partner site network

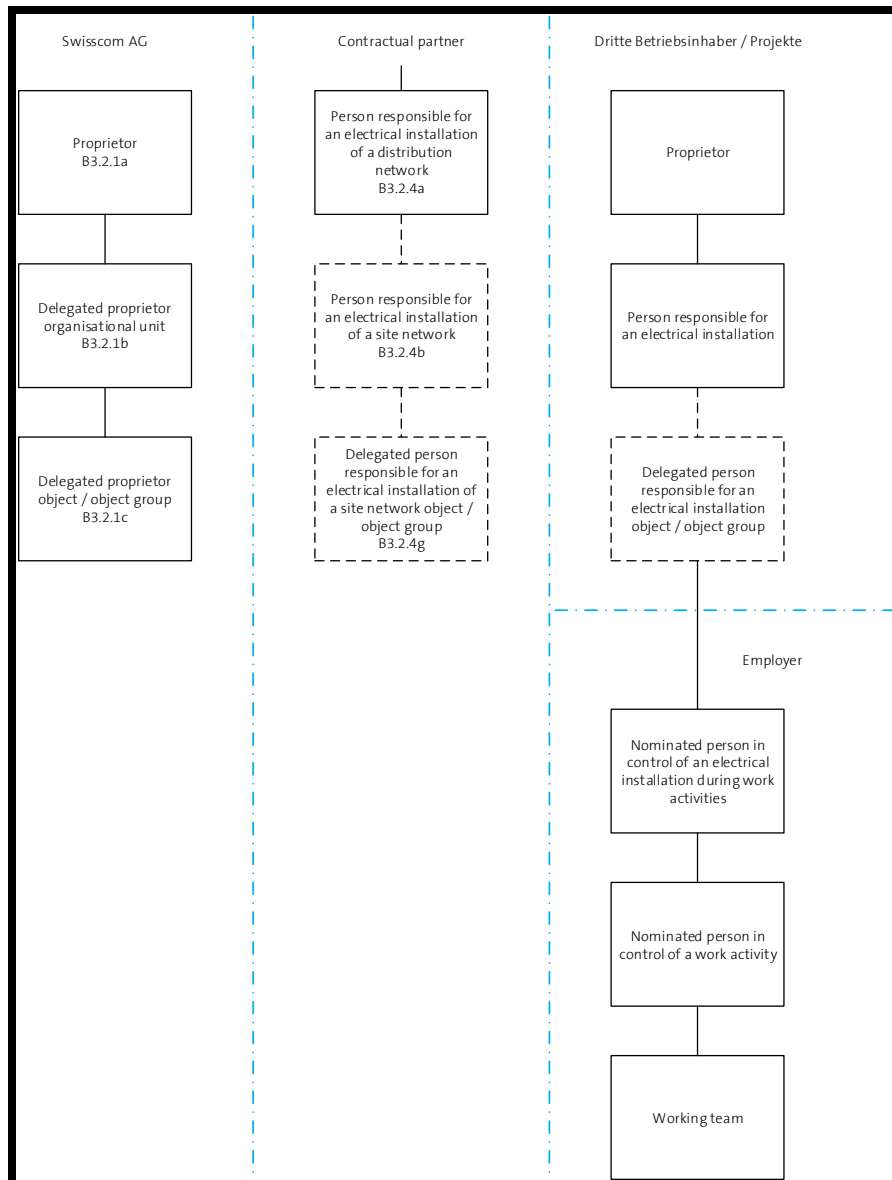


Chart 2.1.2.5: Organisation of third party proprietors and projects for high voltage installations with contract partner

NOTE 1: Continuous lines in the chart symbolise operational functions. Dashed lines symbolise operational but situation-specific functions.

NOTE 2: Independent of the individual functions, the person responsible for an electrical installation and proprietors must ensure that a corresponding partner function exists at the same level. The goal is to ensure that information exchange and communication can be managed in accordance with line and function organisations.

2.1.3 Organisational responsibility

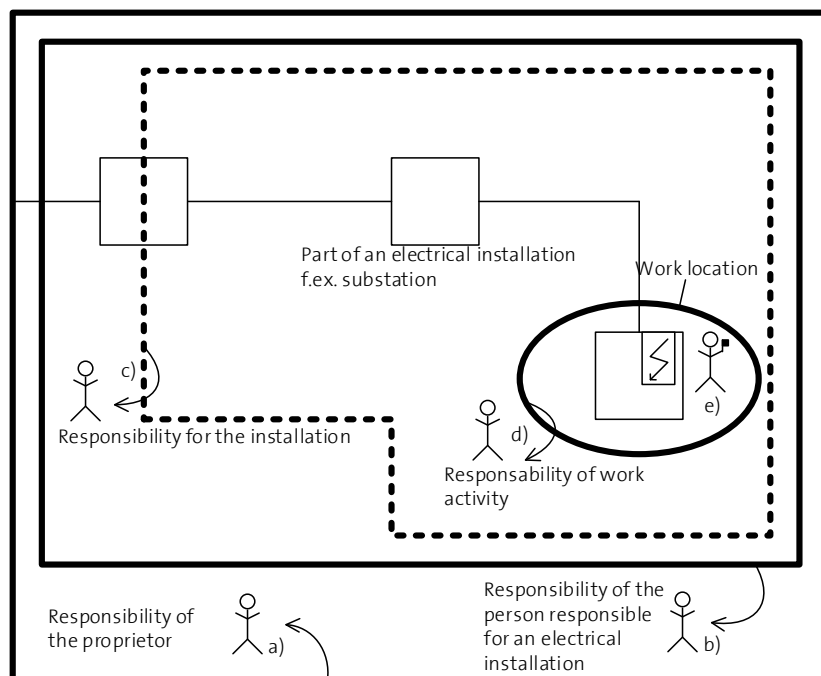


Chart 2.1.3: Responsibility overview [19]

Installations		2.1.1.1	2.1.1.2	2.1.1.3	2.1.1.4	2.1.1.5	2.1.2.X
		Low and extra-low voltage <i>Data centres with FM provider</i>	Low and extra-low voltage <i>Infrastructure installations with FM provider</i>	Low and extra-low voltage <i>Infrastructure installations without FM provider</i>	Low and extra-low voltage <i>Telecommunications installations</i>	High voltage <i>with contract partner site network</i>	High, low and extra-low voltage <i>Installations of third party proprietors / projects</i>
Key							
a)	Proprietor	Swisscom					Third party
b)	Person responsible for an electrical installation	FM provider		Swisscom		Contract partner	Third party
c)	Nominated person in control of an electrical installation during work activities	FM provider	Proprietor / permit holder SC and FM provider				
d)	Nominated person in control of a work activity	Proprietor / permit holder SC and FM provider					
e)	Worker at work location	Proprietor / permit holder SC and FM provider					

Table 2.1.3: Responsibility overview

2.2 Responsibility and delegation

Every person active in the application area as per 1.2 – employed or on behalf of a third party company – is co-responsible for his own safety. Meanwhile, the overall responsibility for a safe operating organisation and for provision of the required personnel and equipment remains with the highest executive function at the company, the group management. This function must initiate and oversee implementation of the work safety and health protection requirements across all organisational units. At Swisscom AG, these duties are delegated to the electrical safety officer.

In the event of an incident with damages, the group management or its substitute can take recourse against the person at fault or their superior(s) in the case of conduct in violation of regulations, negligence or gross negligence.

This means that every person at every level must be permitted to view documents and access information that this person deems relevant for his activity and, in particular, for evaluating the safety situation.

If a person evaluates a situation as risky, he is obligated to say “STOP” and stop the process or to make performance of or permission for the work dependent on improved safety precautions.

Whoever is authorised to delegate duties must guarantee that the delegated person

- a. Has the necessary expertise to carry out the work;
- b. Has received sufficient instruction and is sufficiently supervised.

Only if these conditions are met can the personnel – internal or external – be given the necessary authorisations to carry out the work.

2.2.1 Proprietor responsibility

Legislation and ordinances consistently specify the proprietor as bearing ultimate responsibility. [1][3]

The proprietor Swisscom AG delegates all duties and obligations in accordance with legislation and ordinances to the person responsible for an electrical installation, where the proprietor has a right to be consulted on all decisions. The proprietor must issue the permission for all strategic (technical and economic) decisions.

The person responsible for an electrical installation can delegate some of the obligations associated with this responsibility to the nominated person in control of an electrical installation during work activities. [19]

These functions and persons are designated by name in the personnel assignment list of the object group- or object-specific electrical safety concept.

2.2.2 Coordination between proprietors

Where two or more installations are connected, clear arrangements between the respective proprietors are essential for ensuring safety [19]. The respective organisation can be found in section 2.1.2.

The first contact person for all issues involving third party proprietors is always the nominated person in control of an electrical installation during work activities⁹.

Third party proprietors inform the person responsible for an electrical installation for their electrical installations of the nominated person in control of a work activity⁹ for the systems of Swisscom AG (A2.2.2).

Activities on electrical installations of third party proprietors that have an impact on the electrical installations of Swisscom AG must be announced in writing to the nominated person in control of an electrical installation during work activities⁹ for the systems at least 10 days before performance of the work. The work may only be performed after this person has given written permission. The Swisscom AG electrical safety concept must be applied to all activities and processes as the minimum standard.

If electrical installations of third party proprietors are located in the same rooms as electrical installations of Swisscom AG, the boundary between the areas of responsibility must be clearly and permanently designated. The maintenance of these systems must be coordinated such that it can be carried out completely for all electrical installations in this room.

Lines of third party proprietors at all nominal voltages that run through objects with high-availability systems in which Swisscom AG is owner or lessee of the electrical installations must be labelled. For lines in accordance with the Line Ordinance [8], the provisions of this ordinance must also be complied with and the current work plans must be submitted to the nominated person in control of an electrical installation during work activities⁹ without prompting in accordance with Article 62.

If lines of third party proprietors run through shafts of Swisscom AG, the cables must be run through the shaft in a separate plastic conduit. The plastic conduits and cable systems must be appropriately labelled. The [network information report](#) offers you an opportunity to learn where the cables of Swisscom are located and how they run at no cost.

Proprietor projects are excluded from these provisions. These are regulated in section 2.2.3 of this electrical safety concept.

2.2.3 Proprietor projects

If electrical installations are installed in objects in which Swisscom AG has proprietor responsibility, the creator of the new installation is considered the proprietor. The respective organisation can be found in section 2.1.

After handover of the installation with training and a legally signed document, the system is transferred to Swisscom AG's area of responsibility in accordance with section 4.1. All technical records such as installation plans, schematics, manufacturer information and the like must be provided upon handover.

Activities on electrical installations that have an impact on the electrical installations of Swisscom AG must be announced in writing to the nominated person in control of an electrical installation during work

⁹ This information can be found in section 2.1.2 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

activities¹⁰ at least 10 business days before performance of the work. The work may only be performed after this person has given written permission. The Swisscom AG electrical safety concept must be applied to all activities and processes as the minimum standard.

Switching operations in the primary and secondary supply of existing electrical installations may only be performed based on the instructions of and in consultation with the nominated person in control of an electrical installation during work activities¹⁰ with submission of the written results of the initial inspection.

2.2.4 Coordination between persons responsible for an electrical installation

Where two or more systems are connected, clear arrangements between the respective person responsible for an electrical installation are essential for ensuring safety [19]. Within the area of application of this electrical safety concept, this particularly concerns the coordination between the person responsible for an electrical installation or nominated person in control of an electrical installation during work activities of high voltage, low voltage and telecommunications installations within an object. The respective organisation can be found in section 2.1.2.

2.2.5 Personnel responsibility

The employees are obligated to support the proprietor in the implementation of work safety and the electrical safety concept. They are obligated to manage the technical systems under their responsibility with the assigned competencies and to inform the nominated person in control of an electrical installation during work activities¹¹ or the electro agent of any system deficiencies. They have three obligations, in particular:

- The employees must carry out their work in a safe way. This means following the working conditions, independently taking into account the generally accepted safety rules, making use of protective equipment and personal protective equipment and keeping these in a proper, usable condition. They accept personal responsibility in this regard.

In the event of danger: Say “STOP”, immediately interrupt the activity and contact the supervisor.

- The employees must report any safety defects that they identify;
- The employees must personally be in a condition that permits them to safely carry out the duties assigned to them.

Employees who do not follow the instructions are personally liable for their actions. In the event of violations of provisions of this electrical safety concept, sanctions will be imposed in accordance with section 5.4. The employees of third party companies have the same rights and obligations with regard to electrical safety and work safety as internal employees.

The obligations described above can be met by means of technical documentation for all electrical distribution boards, machines and installations as well as engineering principles.

¹⁰ This information can be found in section 2.1.2 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

¹¹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

Monitoring for activities performed by outside personnel must be carried out by an authorised skilled person or the nominated person in control of an electrical installation during work activities¹².

2.3 Access

2.3.1 Operating area of electrical installations

Access to the operating area of electrical installations is regulated as follows at Swisscom AG:

- Operating areas of electrical installations are locked to prevent access by non-instructed persons.
- Operating areas of electrical installations are clearly and uniformly labelled on the outside, making them identifiable as an operating area of electrical installations. The labelling takes place in the respective official language¹³.
- Access to the operating areas of electrical installations is granted only to persons who can show that they have a work order for the corresponding room. These persons are trained according to Art. 12 StV and rules R2.3 by the nominated person in control of an electrical installation during work activities¹² (or an authorised skilled person).

The nominated person in control of an electrical installation during work activities¹² monitors compliance with the requirements.



Figure 2.3.1: Labelling of the operating area of electrical installations

2.3.2 Electrical operating room

Access to the electrical operating rooms is regulated as follows at Swisscom AG:

- The electrical operating rooms are locked to prevent access by non-instructed persons.
- The electrical operating rooms are clearly and uniformly labelled on the outside, making them identifiable as an electrical operating room. The labelling takes place in the respective official language¹³.
- Access to the electrical operating rooms is granted only to persons who can show that they have a work order for the corresponding room. These persons are trained according to rules R2.3 by the nominated person in control of an electrical installation during work activities¹² (or an authorised skilled person).



Figure 2.3.2: Labelling of an electrical operating room

¹² This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

¹³ The official languages in Switzerland are German, French and Italian

The nominated person in control of an electrical installation during work activities¹² monitors compliance with the requirements.

2.3.3 Battery room

Access to the battery room is regulated as follows at Swisscom AG:

- Battery rooms with closed batteries, sealed batteries >2000 kg and gas-tight batteries >3000 kg are locked to prevent access by non-instructed persons^{14/15}. [1002]
- Battery rooms with sealed batteries ≤ 2000 kg and gas-tight batteries ≤ 3000 kg are closed to prevent access by non-instructed persons. [1002]
- The battery rooms are clearly and uniformly labelled on the outside, making them identifiable as a battery room. The labelling takes place in the respective official language.
- Access to the battery rooms is granted only to persons who can show that they have a work order for the corresponding room. These persons are trained according to rules R2.3 by the nominated person in control of an electrical installation during work activities¹⁶ (or an authorised skilled person).



Figure 2.2.3.1: Labelling of battery room with battery voltage ≤ 60 V DC



Figure 2.2.3.2: Labelling of battery room with battery voltage > 60 V DC



Figure 2.2.3.3: Authorised access only sign

The nominated person in control of an electrical installation during work activities¹⁶ monitors compliance with the requirements.

2.3.4 Telecommunications installations operating room

Access to telecommunications installations operating rooms is regulated as follows at Swisscom AG:

- The telecommunications installations operating rooms are closed to prevent access by non-instructed persons.



Figure 2.3.4.1: Labelling of main distribution frame (MDF)

¹⁴ Protection of assets for battery installations with construction date prior to 2003-04-01: room must be closed (doors) but not locked. An "Authorised access only" sign as per ISO7010 is affixed to the doors. [1002]

¹⁵ Battery rooms are equipped with outward-opening anti-panic doors. The doors may only be lockable from the outside. From the inside, the door must be easy to open with an emergency mechanism. [25][1002]

¹⁶ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

- The telecommunications installations operating rooms are clearly and uniformly labelled.
- Access to telecommunications installations operating rooms is granted only to persons who can show that they have a work order for the corresponding room. These persons are trained according to rules R2.3 by the nominated person in control of an electrical installation during work activities¹⁷ (or an authorised skilled person).

The nominated person in control of an electrical installation during work activities¹⁷ monitors compliance with the requirements.



Figure 2.3.4.2: Labelling of cellular base station



Figure 2.3.4.3: Labelling of transmission point

2.3.5 Switchgear combination

There are no additional provisions for access to switchgear combinations.

The following notice is posted at all switchgear combinations:

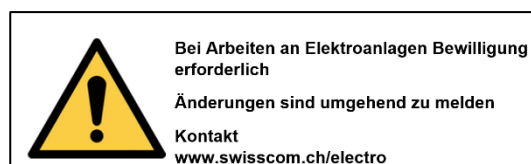


Figure 2.3.5: Sign for switchgear combinations

2.3.6 Visitor

Access to the operating area of electrical installations, electrical operating rooms, battery rooms and telecommunications installations operating rooms is only granted to visitors if they are accompanied by an authorised skilled person, the nominated person in control of an electrical installation during work activities¹⁷ or persons authorised by the latter. In general, only small groups up to a maximum of 5 people may enter the rooms.

(SC) In electrical operating rooms, battery rooms and telecommunications installations operating rooms, a safety distance of at least 80 cm (arm's length) from the electrical installations or batteries must be maintained at all times. In the operating area of electrical installations, a safety distance of at least 150 cm must be maintained.

¹⁷ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

2.4 Swisscom AG guidelines

For the planning and execution of orders in the area of electrical installations, the requirements in the Swisscom AG guidelines must be complied with. In the case of a contradiction between a guideline and accepted principles of engineering, the document owner of the corresponding guideline must be contacted immediately to agree on an appropriate solution. To ensure traceability, the objection and the consequences from this objection must be recorded in writing.

2.5 Order

2.5.1 Procurement

Orders for construction projects or installations are issued according to the currently valid procurement process of the quality management system. The nominated person in control of an electrical installation during work activities¹⁸ is notified of the orders and approves them. In general, orders for electrical installations or equipment may only be initiated after an inspection of the records by a skilled person with in-depth electrotechnical and electrical safety knowledge as well as an understanding of the process.

A conformity declaration is enclosed with every delivery, or a safety dossier is submitted by the creator upon handover of an electrical installation that consists of at least a safety record, including measurement and testing report or statements as per NIV.

Any mandatory documents not automatically submitted will be consistently requested. The corresponding documents are systematically filed and retained (see section 4.1).

Products or installations without conformity declaration or safety dossier may not be connected to the systems of Swisscom AG. Otherwise, the liability (including any claims for compensation for damages) is transferred directly to the company or persons putting the products or the installation into operation.

¹⁸ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

2.5.2 Order process

At Swisscom AG, the order process for work on electrical installations within the area of application of this electrical safety concept takes place according to the diagram shown below:

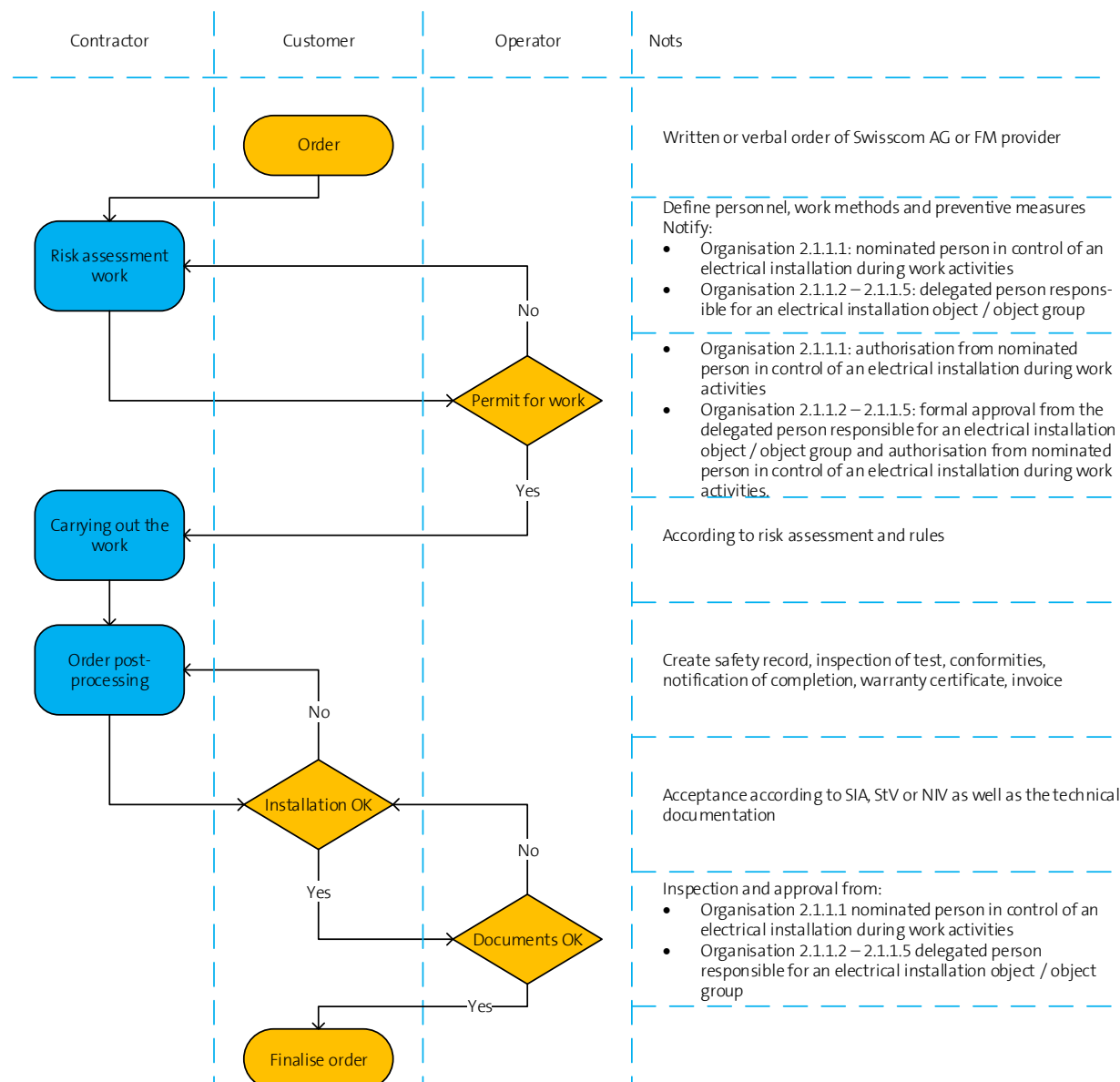


Chart 2.5.2: Order process

In principle, orders are issued in writing. In the case of simple orders and operating disruptions, oral issuing of the order is permitted. The contractor always creates a risk assessment for the work, which defines the delegated person responsible for an electrical installation for the object / object group, the nominated person in control of an electrical installation during work activities, the nominated person in control of a work activity, the workers at work location, the working procedures and the preventive measures; see here Appendix A2.5.3. The results are recorded in the electrical work application form, Appendix A2.5.2, or

equivalent proprietor variant with a precise description of the work and submitted to the nominated person in control of an electrical installation during work activities¹⁹.

The work may not be started until the nominated person in control of an electrical installation during work activities has granted the authorisation [19]. In systems with organisation 2.1.1.2 to 2.1.1.5, the formal approval of the nominated person responsible for an electrical installation for the object / object group is also required. The formal approval consists of checking and approving the order location, the installation and the planned time of work execution. The technical permission (authorisation) must be issued on site by the nominated person in control of an electrical installation during work activities.

NOTE 1: For work with employees of Swisscom (Schweiz) AG or another group company, the work order of Work Force Management Swisscom (Schweiz) AG is considered the formal approval.

NOTE 2: For work with employees of Swisscom Broadcast AG, the work order from Dispatching Swisscom Broadcast AG is considered the formal approval.

The rules R2.5.3, R2.5.3.1x and R4.1.X must be complied with during performance of the work.

After performance of the work, the order-related documents²⁰ must be submitted upon handover of the installation. The order is only considered concluded when these documents have been inspected and no outstanding issues exist from acceptance inspections as per SIA²¹, StV [3] and NIV [7]. For systems with organisation 2.1.1.1, the nominated person in control of an electrical installation during work activities reviews the documents at order conclusion. In systems with organisation 2.1.1.2 to 2.1.1.5, the review is performed by the nominated person responsible for an electrical installation for the object / object group.

¹⁹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

²⁰ Order-related documents are all documents that are required by law, ordinance, accepted principles of engineering and the work contract.

²¹ If the acceptance inspection as per SIA is performed before the acceptance inspection as per NIV, this must be noted accordingly as a reservation on the SIA acceptance report

2.5.3 Work

For all work activity: In case of danger, say “STOP”!

2.5.3.1 Electrical work

In principle, work can be divided into three working procedures [19]:

- a. Dead working;
For details of the working procedures, see rules R2.5.3.1a
- b. Work in the vicinity of live parts;
For details of the working procedures, see rules R2.5.3.1b
- c. Live working:
 1. Live work 1;
For details of the working procedures, see rules R2.5.3.1c1
 2. Live work 2.
For details of the working procedures, see rules R2.5.3.1c2

Whenever possible, dead working must take place.

For work under dry conditions on electrical installations with a continuous voltage below 42.4 V AC peak value or 60 V DC, no measures to protect against electric shock (dangerous shock current) need to be taken [26]. Measures against energy dangers (arcing faults) must be applied as per section 3.3.

In addition to the working procedures listed above, the rules 4.1.X must be complied with.

2.5.3.2 Operating activities

For all operating activities on high voltage installations [3] and on complex low voltage installations, a written switching order with associated risk assessment is mandatory. A switching order is created by a skilled person, then checked and confirmed by the nominated person in control of an electrical installation during work activities as per the personnel assignment list of the object group- or object-specific electrical safety concept. Switching operations may only be carried out according to the switching instruction from the nominated person in control of an electrical installation during work activities.

In high-availability installations, remote switching operations are only permitted in the event of operating disruptions. Planned switching operations must be performed locally. If multiple over-current protection devices arranged in series must be switched during activities on a network, the top-down principle²² must be applied. This means that the over-current protection devices closest to the energy source must be switched first. Then the other over-current protection devices in the secondary supply are switched and finally those of the tertiary supply.

²² The top-down principle is used to reduce the risk of operational failures due to faulty switching operations.

For simple work and work as per section 2.5.4, oral issuing of a switching order is permitted. However, this work may only be carried out by an authorised switching technician (see authorisation matrix A3.2.X) who has received the direct order.

Operating activities may only be carried out by skilled persons or instructed persons. For high voltage installations, switching authorisation for the specific systems is also required. [3]

2.5.3.3 Non-electrical work [19]

A defined distance must always be maintained for construction work and other non-electrical work in the vicinity of live parts, such as:

- Staging work;
- Work with lifting equipment, construction machines and conveyors;
- Installation work;
- Transport work;
- Painting and renovation work;
- (SC) Fire protection work;
- Positioning of other equipment and construction devices,

This applies in particular in the case of swinging out loads, support equipment and lifting tackle. This distance must be measured from the closest conductor or bare live part.

Electrical dangers in the vicinity of live parts must be prevented with through protection by screen, barrier, enclosure or insulating covering.

This specified distance must be determined based on D_V (A2.5.3.1), increased by another distance.

The following must be taken into account when specifying this:

- System voltage;
- Kind of work;
- Equipment to be used;
- The fact that the involved persons have no electrical expertise.

2.5.3.4 Use

The operation of an installation from a safe location using devices designed for this purpose that can be used safely without further preventive measures is not considered electrotechnical or non-electrical work. [2]

2.5.4 Operating disruptions

For disruptions in electrical installations during normal working hours, the nominated person in control of an electrical installation during work activities²³ must be contacted.

For operations-related telecommunications equipment, the alarm notification function of the respective Swisscom AG organisational unit is automatically informed.

The alarm notification function of the respective Swisscom AG organisational unit or the nominated person in control of an electrical installation during work activities²³ initiates the further measures in cooperation with the respective person on-call for emergencies.

In the case of operating disruptions outside of the normal working hours, the person on-call for emergencies must be contacted. The person on-call for emergencies informs the nominated person in control of an electrical installation during work activities²³ immediately about the deployment, its result and consequences.

The person on-call for emergencies takes over responsibility for the electrical installation with the operating disruption during the deployment until the situation is resolved or the nominated person in control of an electrical installation during work activities for systems with organisation as per 2.1.1.1 is on site.

Emergency on-call agreements with the FM provider or system supplier are in place for this purpose.

In the event of operating disruptions in systems as per 2.1.1.1 and 2.1.1.2, the nominated person in control of an electrical installation during work activities²³ informs the delegated proprietor about the deployment, its result and consequences in writing within one business day.

Procedure for disruptions in electrical installations:

Look

- Examine and analyse the situation;

Think

- Identify consequential dangers for people and property;
- Am I technically, mentally and physically capable of fixing the operating disruption myself?
 - Yes: Act;
 - No: Call in a specialist²⁴;

Act

- Locate the problem;
- Correct the problem (Correction of the problem must be based on a careful determination of the cause. Problems fixed by trial and error are not considered fixed);
- Function check;

²³ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

²⁴ The specialist again applies the entire procedure for disruptions on electrical installations: Look, think, act

- Notification to the affected parties (for extensive operating disruptions: regular updates to the affected parties).

In general during disruptions: Say “STOP” in case of danger or uncertainty!

2.6 Rules

The rules that apply in the area of electrical installations are associated with specific activities. The activities permitted within the area of application of this electrical safety concept and the assigned rules are described in the following rules of this electrical safety concept:

- R2.3 Rules for access:
 - .1 Operating area of electrical installations;
 - .2 Electrical operating room;
 - .3 Battery room;
 - .4 Telecommunications installations operating room.
- R2.5.1.1 Rules for supporting outside personnel;
- R2.5.1.2 Rules for the procurement process;
- R2.5.1.3 Rules for managing construction projects;
- R2.5.3 Work
 - R2.5.3.1a Rules for dead working;
 - R2.5.3.1b Rules for work in the vicinity of live parts;
 - R2.5.3.1c1 Rules for live work 1;
 - R2.5.3.1c2 Rules for live work 2;
 - R2.5.3.2.1 Rules for switching:
 - a. High voltage;
 - b. Low and extra-low voltage primary and secondary supply;
 - c. Low and extra-low voltage tertiary supply;
 - d. General energy generation plant;
 - e. Operationally critical energy generation and storage systems.
 - R2.5.3.2.2 Rules for resetting low voltage;
- R2.7.6 Rules for issuing instructions;
- R2.8 Emergency arrangements;
- R2.8.4 Rules for first aid for electrical accidents;
- R2.8.5 Rules for first aid for electrolyte accidents;
- R4.1 Rules for network operator duties;
 - R4.1.1 Rules for high voltage installations;
 - R4.1.2 Rules for low and extra-low voltage installations;

- R4.1.3 Rules for work on battery installations;
- R4.1.6a Rules for work on telecommunications installations < 60 V DC;
- R4.1.6b Rules for work on telecommunications installations > 60 V DC;
- R4.1.7 Rules for use and operation of electrical installations and equipment by ordinary persons.

2.7 Training and instruction

2.7.1 General

At an organisational level, information notices, instructions and training serve as central measures for minimising risk and preventing accidents. All employees must therefore be provided with information about general risks and risk-reducing measures as well as the generally applicable safety rules and emergency measures (Art. 6 VUV, Art. 5 ArG, etc.).

Employees of third party companies are considered equivalent to internal personnel in this respect. The proper use of work resources (tools, installations, devices, etc.) must be taught with respect to the specific workplace or activity. This instruction must generally be provided upon taking up the position and must be subsequently repeated at appropriate intervals and in the event of any changes to the workplace and/or work procedures. Such general safety instruction must place great emphasis on the dangers involved with electricity and especially on the fact that activities in the area of electrical installations are dangerous and may therefore only be carried out by appropriately authorised persons (skilled person or instructed person).

The performance, coordination and monitoring of the general training measures not relating to electrical safety is not covered by this document.

2.7.2 Instruction of persons authorised to work in the operating area of electrical installations

Persons who have access to the operating area of electrical installations, who carry out operational actions or who work on the systems are instructed in the following topics [3]:

- a. Dangers of approaching live parts;
- b. Immediate measures and aid in the event of accidents;
- c. Installations to be accessed along with information on escape routes and emergency call numbers;
- d. Operational actions and work to be carried out by the personnel;
- e. Procedure in the event of fire.

In addition to these principles, the instruction content for persons who work in the vicinity of electrical installations must be based on the general provisions and safety principles in this electrical safety concept (section 1 to 4). Depending on the person or category of person, instruction should also be provided in the content of the authorisation forms and safety rules of the object group- or object-specific electrical safety concept.

Confirmation of receiving the instruction will be issued after each instruction session.

The instruction must be repeated regularly. The time between two instruction sessions is based on the level of training and education of the persons involved, the work to be performed and the type of installations.

(SC) The instruction must be repeated at least every 2 years.

Instruction of the persons authorised to work in the operating area is the responsibility of the nominated person in control of an electrical installation during work activities in accordance with the personnel assignment list of the object group- or object-specific electrical safety concept.

2.7.3 Instruction of the persons authorised to enter the electrical operating rooms

Persons who have access to the electrical operating rooms, who carry out operational actions or work on the installations are instructed in the following topics:

- a. Operational actions and work to be carried out by the personnel.

In addition to these principles, the instruction content for persons who work in the vicinity of electrical installations must be based on the general provisions and safety principles in this electrical safety concept (section 1 to 4). Depending on the person or category of person, instruction should also be provided in the content of the authorisation forms and safety rules of the object group- or object-specific electrical safety concept.

Confirmation of receiving the instruction will be issued after each instruction session.

The instruction must be repeated regularly. The time between two instruction sessions is based on the level of training and education of the persons involved, the work to be performed and the type of installations.

(SC) The instruction must be repeated at least every 2 years.

Instruction of the persons authorised to enter the electrical operating rooms is the responsibility of the nominated person in control of an electrical installation during work activities²⁵.

Persons who have already received the instruction for persons authorised to enter the operating area of electrical installations do not have to receive this instruction again separately.

2.7.4 Instruction of the persons authorised to enter the battery rooms

Persons who have access to the battery rooms, who carry out operational actions or work on the installations are instructed in the following topics:

- a. Dangers of approaching batteries (electrolyte dangers);
- b. Immediate measures and aid in the event of accidents with electrolytes;
- c. Operational actions and work to be carried out by the personnel.

In addition to these principles, the instruction content for persons who work in the vicinity of electrical installations must be based on the general provisions and safety principles in this electrical safety concept (section 1 to 4). Depending on the person or category of person, instruction should also be provided in the content of the authorisation forms and safety rules of the object group- or object-specific electrical safety concept.

Confirmation of receiving the instruction will be issued after each instruction session.

²⁵ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

The instruction must be repeated regularly. The time between two instruction sessions is based on the level of training and education of the persons involved, the work to be performed and the type of installations.

(SC) The instruction must be repeated at least every 2 years.

Instruction of the persons authorised to enter the battery rooms is the responsibility of the nominated person in control of an electrical installation during work activities²⁶.

2.7.5 Instruction of persons authorised to enter the telecommunications installations operating room

Persons who have access to telecommunications installations operating rooms, who carry out operational actions or work on the systems are instructed in the following topics:

b. Operational actions and work to be carried out by the personnel.

In addition to these principles, the instruction content for persons who work in the vicinity of electrical installations must be based on the general provisions and safety principles in this electrical safety concept (section 1 to 4). Depending on the person or category of person, instruction should also be provided in the content of the authorisation forms and safety rules of the object group- or object-specific electrical safety concept.

Confirmation of receiving the instruction will be issued after each instruction session.

The instruction must be repeated regularly. The time between two instruction sessions is based on the level of training and education of the persons involved, the work to be performed and the type of installations.

(SC) The instruction must be repeated at least every 2 years.

Instruction of the persons authorised to enter the telecommunications installations operating room is the responsibility of the nominated person in control of an electrical installation during work activities²⁶.

Persons who have already received the instruction for persons authorised to enter the operating area of electrical installations or to enter electrical operating rooms do not have to receive this instruction again separately.

2.7.6 Delegating and combining types of instruction

If instructions relating to electrical safety are delegated and/or carried out in combination with general safety instructions (e.g. concerning non-electrical risks, fundamentals of electrical safety, etc.), the party responsible for electrical safety is responsible for the corresponding technical portion as well as for coordination with the adjacent technical areas.

The instruction concerning electrical safety may only be given by the electrical safety officer, electro agent, nominated person in control of an electrical installation during work activities (B3.2.5c) or an authorised skilled person.

²⁶ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

2.7.7 Training

In order that the duties, responsibilities and authorisations of the various functions can be realised, specific training is required for the following functions:

- B3.2.1 Proprietor and delegated proprietor;
- B3.2.2 Electrical safety officer;
- B3.2.3 Electro agent;
- B3.2.4 Person responsible for an electrical installation and nominated person responsible for an electrical installation;
- B3.2.5 Nominated person in control of an electrical installation during work activities;
- B3.2.6 Nominated person in control of a work activity;
- B3.2.7 Skilled persons (electrically);
- B3.2.8 Instructed persons (electrically);
- B3.2.9 Ordinary persons (electrically);
- B3.2.10.1 Authorised person for general installation work (Art. 9 NIV);
- B3.2.10.2 Authorised person for work on company-owned installations (Art. 13 NIV);
- B3.2.10.3 Authorised person for installation work on special systems (Art. 14 NIV);
- B3.2.10.4 Authorised person with connection permit (Art. 15 NIV);
- B3.2.10.5 Authorised person for work on products (NEV);
- B3.2.10.6 Authorised person for work on installations as per the Heavy Current Ordinance (StV);
- B3.2.10.7 Authorised person for inspections and tests.

The content of the training is based on the corresponding duties and can contain the following modules:

- a. Fundamentals and dangers of electricity:
 - Fundamentals of electricity;
 - Fundamentals of electrical installations;
 - Fundamentals and dangers of electricity.
- b. First aid for electrical and electrolyte accidents:
 - First aid (BLS);
 - CPR / AED;
 - Rescuing patients in electrical installations;
 - Rescuing patients in battery installations.
- c. Work safety:
 - Conduct during an incident;



- Preventing measures;
- Access.
- d. Order process:
 - Issuing of the order;
 - Monitoring and auditing of work locations;
 - Electrical safety;
 - Supporting outside personnel;
 - Documentation (safety record, conformity).
- e. Authorisation, duties, competence and responsibility;
- f. Live working:
 - Working procedures s;
 - Personal protective equipment against electrical hazards.
- g. Activity-specific continuing training in general:
 - Technical and informational trainings;
 - Principles of engineering;
 - Working procedures s;
 - Earthing of installations;
 - Measurement and inspection;
 - Switching.
- h. Activity-specific continuing training of instructed persons:
 - Personal protective equipment against electrical hazards;
 - Area of activity;
 - Replacement of cartridge fuses;
 - Resetting of circuit breakers and residual current devices;
 - Measurement;
 - Conduct in electrical installations.

Appendix A2.7 of the object group- or object-specific electrical safety concept defines training topics, the responsibility and frequency of training for persons and categories of persons.

2.8 Emergency arrangements

In the event of injuries and acute illnesses, rapid and competent help must be ensured. Because most work locations are not permanent locations, the emergency organisation must always be adapted to the specific conditions. The procedure in the event of emergencies (accident, fire) and the important emergency numbers (police, fire brigade, emergency medical services, air rescue service, etc.) must be known to all employees who carry out work for Swisscom AG. The specific emergency information card for Swisscom AG is issued to all internal and external employees.

The content of the emergency information card is evaluated annually by the Swisscom AG Safety Officer and updated, if necessary. The internal and external employees must also know the local emergency number for the site medical service.

In general, patients may not be transported to the emergency aid location by private vehicles. The corresponding emergency medical services must be utilised.

In the operating area of electrical installations, information signs with emergency call number and important information on conduct and first aid measures in the event of electrical accidents must be posted. [3]

In battery rooms and electrical operating rooms with closed or sealed batteries, information signs with emergency call number and important information on conduct and aid measures in the event of accidents with batteries must be posted. [42]

Swisscom emergency number: 0800 88 00 88

Rescue and first aid always take priority over notifications unless the notification is required for the rescue or first aid.

Any incident involving people that is caused by electricity must be reported immediately by calling the emergency number. The emergency number operator will orally inform the following parties (in the listed order):

Swisscom (Schweiz) AG, Swisscom Immobilien AG and other group companies:

1. Swisscom AG electrical safety officer +41 58 224 06 52;
2. Electrical safety officer of the FM provider²⁷ +41 58 787 82 75;
3. Nominated person responsible for an electrical installation;
4. Delegated proprietor;

The electrical safety officer of Swisscom AG informs the electro agent of the respective organisational unit.

Swisscom Broadcast AG:

1. Swisscom Broadcast AG electrical safety officer +41 58 221 51 52;
2. Nominated person responsible for an electrical installation;

Swisscom Broadcast AG's electrical safety officer informs Swisscom AG's electrical safety officer.

²⁷ The Electrical safety officer of the FM provider is only contacted for installations that are managed by the FM provider

Any personal injury or significant property damage caused by electricity must be reported immediately by calling the emergency number. The emergency number operator will orally inform the following parties (in the listed order):

Swisscom (Schweiz) AG, Swisscom Immobilien AG and other group companies:

1. Swisscom AG electrical safety officer +41 58 224 06 52;
2. Electrical safety officer of the FM provider²⁸ +41 58 787 82 75;
3. Federal Inspectorate for Heavy Current Installations (ESTI)²⁹ +41 58 595 18 00;
4. Nominated person responsible for an electrical installation;
5. Delegated proprietor;
6. Competent cantonal offices (only for significant personal injuries) [3].

The electrical safety officer of Swisscom AG informs the electro agent of the respective organisational unit.

Swisscom Broadcast AG:

1. Swisscom Broadcast AG electrical safety officer +41 58 221 51 52;
2. Federal Inspectorate for Heavy Current Installations (ESTI)²⁹ +41 58 595 18 00;
3. Nominated person responsible for an electrical installation;
4. Competent cantonal offices (only for significant personal injuries) [3].

Swisscom Broadcast AG's electrical safety officer informs Swisscom AG's electrical safety officer.

If it is not clear initially whether an incident involving people or personal injury is involved, how to assess the case is determined based on the result of the hospital monitoring. The ESTI is therefore not informed immediately, rather only after this evaluation.

In the event of personal injury or significant property damage, no changes may be made to the accident site until the local accident investigation by the Federal Inspectorate for Heavy Current Installations (ESTI) and the state attorney's office has been concluded. This does not apply to required immediate measures for preventing further accidents or damages or ensuring continued operations.

²⁸ The electrical safety officer of the FM provider is only contacted for installations that are managed by the FM provider

²⁹ The Federal Inspectorate for Heavy Current Installations (ESTI) is contacted exclusively after consultation by the nominated person in control of an electrical installation during work activities or person responsible for an electrical installation with the electrical safety officer.

2.8.1 Rescuing of the patient

The patient himself and/or electrical installations or equipment in the area of a patient may be energised.
Always protect yourself first!

2.8.2 Rescue from the low voltage area

Isolation between patient and rescuer

- Approach the patient;
- Take hold of dry, isolating clothing;
- Push out of the live working zone;
- Do not take hold of wet or naked body parts;
- Ensure an isolating location;
- Or separate the patient from the live object;
- By kicking away the object with an isolating shoe, pulling away an isolating cable or using an isolating tool.

The electrical energy may only be switched off for such a rescue if this can be done immediately and with absolute safety.

2.8.3 Rescue from the high voltage area

In general, the installation must be switched off by calling telephone number 117. Skilled persons for high voltage electricians may out the rescue in the presence of a live installation if this can be done safely.

2.8.3.1 Rescue in the presence of a live installation

Rescue with a safe distance from outside the vicinity and live working zone by a skilled person for high voltage:

- Decide whether the patient can be rescued without endangering the rescuer by using the rescue hook designed for the high voltage that is present. The rescuer is located outside the danger and vicinity zone;
- Put on protective equipment;
- Pull the patient out of the danger area using rescue hooks while maintaining a safe distance.

2.8.3.2 Rescue with isolated installation

Rescue without safe distance from the vicinity and live working zone:

- Disconnect the high voltage installations according to the five safety rules (the 5 safety rules must be followed by a skilled person or instructed person outside of the danger and vicinity zone. PPE-E is required);
- Rescue the patient from the live working zone.

2.8.4 First aid for an electrical accident

- Check consciousness;
 - Conscious: Help as appropriate and call the emergency number 144
 - Not conscious:
- Call for help;
- Check breathing;
 - Conscious: Bring the unconscious person into a safe posture and call the emergency number 144
 - Not conscious:
- Call the emergency number 144 and obtain or request³⁰ an AED;
- Provide aid;
 - 30 cardiac pressure massages, each 5 – 6 cm deep (or 1/3 of the rib cage diameter) with a frequency of 100 – 120 times per minute, firmly and quickly at the middle of the rib cage;
 - 2x breaths;
 - Use AED and follow instructions;
 - Continue resuscitation measures until rescue personnel arrive and have taken over care of the patient.

The rules can be found on the information sign for electrical accidents R2.8.4.

2.8.4.1 Burns

- Cool burns immediately with water and for a prolonged period (often 15 minutes or longer);
 - Other parts of the body should not be cooled;
- Do not remove clothing;
 - Do not apply any plasters, bandages or other materials to the burn wounds;
- Call the emergency number 144 for burns to the face and neck as well as 2nd and 3rd degree burns larger than the size of 9 of the patient's palms;
- Continue care until rescue personnel arrive, monitoring the patient's general condition;
 - Do not allow the patient to cool down too much.

³⁰ Only if at least two people are locally present; the accident victim must always be cared for and may never be left alone

2.8.4.2 Bleeding

- Raise injured body part;
- Exert opposing pressure using an absorptive material;
- Stop the bleeding with a pressure bandage;
- Call the emergency number 144 in cases of heavy bleeding;
 - Continue care until rescue personnel arrive, monitoring the patient's general condition.

2.8.5 First aid for an electrolyte accident

Acidic and alkaline electrolytes can cause chemical burns to the eyes and skin. To remove electrolyte that is been sprayed onto body parts, a source of clean water must be kept available in the immediate vicinity of the battery, such as a water tap or sterile water container. [25][1002]^{31/32}.

The rules can be found on the information sign for electrolyte accidents R2.8.5.

2.8.5.1 Chemical exposure of the eyes

In the event of accidental contact with electrolyte, the eyes must be rinsed for a prolonged period with large quantities of water. Medical assistance must always be obtained immediately. [25]

2.8.5.2 Chemical exposure of the skin

In the event of accidental contact with electrolyte, the affected areas of the skin must be rinsed with large quantities of water or a corresponding neutralising solution. If skin irritation persists, medical assistance must be obtained. [25]

³¹ Before starting the work, the worker must check the location of the nearest source of clean water in order that body parts exposed to electrolyte can be rinsed off with large quantities of water.

³² In the case of sealed batteries ≤ 2000 kg and gas-tight batteries ≤ 3000 kg, an available water connection or reserve water is not mandatory. When working on battery installations, the person performing the work must carry his or her own eye rinse bottle.

2.8.6 Electrical fires

If electrical installations or equipment catch fire, they may still be live. **Always protect yourself first!**
Procedure in the event of fire:

- Keep calm;
- Assess the situation;
- Signal the alarm (hand fire alarm or call 118);
- Switch off electrical energy (only if this can be done immediately and with absolute safety);
- Rescue anyone in danger (see section 2.8.X);
- Extinguish the fire.

Consult the Appendix for a suitable extinguishing agent and the required safety distances A2.8.6.

Observe the operating instructions and warnings on the extinguishing equipment.

Fires in the area of electrical installations should be fought with a water spray, if possible (not a jet spray).

2.8.6.1 Extinguishing burning persons

Burning persons must be prevented from running about and should roll around on the ground, if necessary. Water and extinguishing blankets are particularly suited for extinguishing burning clothing on a person. Wrapping with other blankets, except for flammable plastic blankets, can also help. Other extinguishing agents can also be used if they are the only way to quickly extinguish the fire since this objective must take precedence over other considerations.

3 Safety principles for people

Proprietors and contractors are required by law and standards to establish various processes for ensuring work safety, protection of health and the safety of third parties. The required documentation is the responsibility of the person responsible for an electrical installation and will be maintained by him/her. The goal of the processes is to protect the life and health of all persons who carry out activities on electrical installations, in the operating area of electrical installations or in electrical operating rooms.

For all activities: In case of danger, say “STOP”!

The most important aspect of prevention is the risk assessment. A risk assessment must be prepared for every activity. This risk assessment must list the key dangers and identify corresponding preventive measures. The STOP principle is applied for identifying the preventive measures.

1. Substitute danger sources

Either entirely eliminate danger sources or “disarm” them sufficiently that a danger no longer exists.

Examples: Replace dangerous substances with more harmless substances; instead of low voltage (230 V), use safety extra low voltage (24 V), etc.

2. Technical measures

“Cordon off” hazards or reduce them with protective equipment.

Examples: Create safety isolation barriers to live working zones, enclose machinery in protective grating or fencing.

3. Organisational measures

Spatial and/or temporal separation between a danger source and humans.

Examples: Separating footpaths and forklift routes, restricting the number of people allowed in a specific working zone, limiting the working time for work with high exposure to noise or harmful substances.

4. Personnel measures

Individual protection of people through correct conduct and, where necessary, use of personal protective equipment. These measures are subordinate to the previous measures.

Examples: Use of safety glasses, helmet or safety shoes, work safety instruction, forklift driver training, rules of conduct, such as in the form of operating procedures.

3.1 Personnel qualifications

All persons who carry out work on electrical installations in objects of the proprietor must meet the minimum competences for the corresponding work.

3.1.1 Electrical work

The following minimum competences are required for all work in the operating area of electrical installations and in electrical operating rooms:

- a. Instruction in emergency measures, conventional first aid as well as CPR and AED (at least 1 person per work location) [19];
- b. Instruction of the persons authorised to enter the operating area of the electrical installations or electrical operating rooms adapted to the specific work location.

The following competences are required for work on electrical installations:

- c. Work on low voltage and extra-low voltage installations:
 - Skilled person or instructed person.
- d. Work on low and extra-low voltage energy distribution systems:
 - Skilled person for low and extra-low voltage or instructed person.
- e. Work on high voltage distribution systems:
 - Skilled person for high voltage.
- f. Inspection of low voltage (all installations except for high-availability installations):
 - Skilled person for inspection.
- g. Inspection of low voltage (high-availability installations³³)
 - Skilled person for the inspection of high-availability installations.
- h. On-call service:
 - **(SC)** Skilled person and additional on-call examination by Swisscom AG³⁴.

Third party companies confirm in writing that their personnel has the corresponding education and experience for working with electrical installations in accordance with work types c to h.

For employees of Swisscom AG, the electro agent of the respective organisational unit will confirm competence to carry out work Point d if the person has appropriate education and experience in working with electrical installations.

(SC) The proprietor reserves the right to evaluate the education and experience of third party companies and to request corresponding documentation.

³³ For 48 V DC power supply systems, a skilled person for inspection with corresponding instruction from Swisscom AG is sufficient

³⁴ Only for high-availability installations

3.1.2 Non-electrical work

The following minimum competences are required for all work in the operating area of electrical installations and in electrical operating rooms:

- a. Instruction in emergency measures, conventional first aid as well as CPR and AED (at least 1 person per work location) [19];
- b. Instruction of the persons authorised to enter the operating area of the electrical installations or electrical operating rooms adapted to the specific work location.

3.2 Authorisation, duties, competence and responsibility

The responsibility matrix A3.2.1 assigns responsibilities for the rules RX.X.X to a number of persons and categories of persons.

The authorisation matrix A3.2.X assigns authorisations for the activities permitted by rules RX.X.X to a number of persons or categories of persons.

The supplement to the electrical safety concept “Authorisation, duties, competence and responsibility” BX.X.X lists the authorised activities as well as the competences, duties and responsibilities.

B3.2.1 Proprietor:

- .a Proprietor;
- .b Delegated proprietor in the organisational unit;
- .c Delegated proprietor for an object / object group;

B3.2.2 Electrical safety officer:

- .a Swisscom AG electrical safety officer;
- .b Swisscom Broadcast AG electrical safety officer;
- .c FM provider Electrical safety officer.

B3.2.3 Electro agent;

- B3.2.4 Person responsible for an electrical installation:
- .a Person responsible for an electrical installation of a high voltage distribution network;
 - .b Person responsible for an electrical installation of a high voltage site network;
 - .c Person responsible for an electrical installation of low and extra-low voltage infrastructure systems;
 - .d Person responsible for an electrical installation of low and extra-low voltage telecommunications installations;
 - .e Nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations in the organisational unit;
 - .f Nominated person responsible for an electrical installation of low and extra-low voltage telecommunications installations in the organisational unit;
 - .g Nominated person responsible for an electrical installation of a high voltage site network for an object / object group;
 - .h Nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for an object / object group;
 - .i Nominated person responsible for an electrical installation of low and extra-low voltage telecommunications installations for an object / object group
- B3.2.5 Nominated person in control of an electrical installation during work activities:
- .a Nominated person in control of an electrical installation during work activities of a high voltage distribution network;
 - .b Nominated person in control of an electrical installation during work activities of a high voltage site network;
 - .c Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure systems at the FM provider;
 - .d Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure systems;
 - .e Nominated person in control of an electrical installation during work activities of low and extra-low voltage telecommunications installations.
- B3.2.6 Nominated person in control of a work activity;
- B3.2.7 Skilled persons (electrically)
- .a Skilled person;
 - .b Skilled person for low and extra-low voltage;
 - .c Skilled person for high voltage;
 - .d Skilled person for electrical safety;

- .e Skilled person for electrical safety of high-availability installations;
 - .f Authorised skilled person.
- B3.2.8 Instructed persons:
- .a Swisscom AG proprietor and person responsible for an electrical installation;
 - .b Swisscom AG project manager / service manager;
 - .c Swisscom AG;
 - .d FM provider with switching authorisation;
 - .e FM provider;
 - .f Security service, reception staff, cleaning staff;
 - .g Colocation partner;
 - .h Fire brigade;
 - .i External parties.
- B3.2.9 Ordinary persons (electrically);
- B3.2.10.1 Authorised person for general installation work (Art. 9 NIV);
- B3.2.10.2 Authorised person for work on company-owned installations (Art. 13 NIV);
- B3.2.10.3 Authorised person for installation work on special systems (Art. 14 NIV):
- .a Swisscom AG;
 - .b FM provider;
 - .c External parties.
- B3.2.10.4 Authorised person with connection permit (Art. 15 NIV):
- .a Swisscom AG;
 - .b FM provider;
 - .c External parties.
- B3.2.10.5 Authorised person for work on products (NEV)
- B3.2.10.6 Authorised person for work on installations as per the Heavy Current Ordinance (StV);
- B3.2.10.7 Authorised person for inspections and tests:
- .a Inspection of low and extra-low voltage (NIV);
 - .b Inspection of high-availability installations of low and extra-low voltage (NIV);
 - .c Inspection of heavy current installations (StV);
 - .d Testing of electrical devices (NEV).

3.3 Personal protective equipment against electrical hazards (PPE-E)

3.3.1 Basic principle

You are important to us – protect yourself from danger!

The contractor is obligated to take all measures for preventing work accidents and occupational illnesses that are required based on experience, feasible based on the state of the art and appropriate to the existing conditions. [15]

The contractor must include the participation of the employees in the prevention of work accidents and occupational illnesses. [15]

The employees are obligated to support the contractor in the implementation of regulations for preventing work accidents and occupational illnesses. In particular, they must use personal protective equipment and safety equipment correctly, without removing or modifying such equipment unless authorised by the contractor. [15]

Wearing personal protective equipment against electrical hazards cannot influence or eliminate dangers. However, personal protective equipment against electrical hazards can reduce or eliminate the consequences of dangers for persons. It makes a key contribution to avoiding accidents and occupational illnesses and to reducing the costs of accidents.

3.3.2 Use

For activities in the vicinity and live working zone of live electrical installations, the wearing of inspected personal protective equipment against electrical hazards is mandatory in accordance with the danger potential (Appendix A3.3.2). [40]

Protection	Protective clothing as per IEC 61482-2	Design
Basic protection	Class 1	4 kA for 0.5 s, at a distance of 30 cm
High protection	Class 2	7 kA for 0.5 s, at a distance of 30 cm

Table 3.3.2: Use of PPE-E

Examples and details of the use of personal protective equipment against electrical hazards can be found in Appendix A3.3.2.X.

(SC) A separate risk assessment must be created by the nominated person in control of a work activity before all work.

Every person working in the area of application as per section 1.2 who performs work on electrical installations must be ensured access to suitable personal protective equipment as per IEC 61482. This includes a helmet and face protection or a protective hood, rubber gloves – including Kevlar inner gloves (if necessary) or safety shoes and protective clothing covering the hips. [\(E+E\)](#).

(SC) If work is required on electrical installations in the operating area of electrical installations or in electrical operating rooms, possession of the corresponding personal protective equipment must be a requirement for entry.

No PPE-E = no entry.

Swisscom AG provides the following personal protective equipment against electrical hazards (PPE-E) to employees working in electrical areas:

- Body protection class 2, as per IEC 61482;
- Hand and face protection class 2, as per IEC 61482.

The issuing of and instruction in personal protective equipment against electrical hazards (PPE-E) is the responsibility of the supervisor of the respective organisational unit. The care and maintenance is in the responsibility of the respective user.

4 Safety principles for installations

Proprietors are required by law and standards to establish various processes to ensure system safety. The required documentation is the responsibility of the nominated person in control of an electrical installation during work activities³⁵ and is maintained by him. The goal of the processes is to ensure the high availability and safe operation of the electrical installations.

(SC) All documents (conformity declarations, safety record, measurement and testing reports, inspection reports) must be retained for at least one inspection cycle and for at least 10 years. Documents in accordance with the Heavy and Weak Current Ordinances must be retained for at least two inspection cycles and at least 10 years.

For installations as per 2.1.1.1 and 2.1.1.2, the documents are filed in electronic form at the central office as per NIV. For all other systems, they are filed with the respective person responsible for an electrical installation.

Address of proprietor for all documents at Swisscom (Schweiz) AG and Swisscom Immobilien AG:

Swisscom AG
Alte Tiefenastrasse 6
CH-3050 Bern

Address of proprietor for all documents at Swisscom Broadcast AG:

Swisscom Broadcast AG
Ostermundigenstrasse 99
CH-3050 Bern

Address of proprietor for all documents at other group companies:

Respective registered office as per commercial register entry.

Due to the high importance, a copy of the inspection reports of the Federal Inspectorate for Heavy Current Installations (ESTI) must also be sent immediately to the electrical safety officer of the respective Swisscom AG group company.

Swisscom AG electrical safety officer contact information
(for objects of Swisscom (Schweiz) AG, Swisscom Immobilien AG and other group companies):

Swisscom AG
Electrical safety officer
electro.safety@swisscom.com

Swisscom Broadcast AG electrical safety officer contact information
(for objects of Swisscom Broadcast AG):

Swisscom Broadcast AG
Electrical safety officer
SBC-Safety.Elektro@swisscom.com

³⁵ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

4.1 Electrical safety record for new installations

New installations consist of entirely newly built systems as well as extensions, changes and replacements of existing systems. The corresponding documents must be submitted to the corresponding offices upon handover of the installation.

For locations outside Switzerland, the respective national regulations and authorities must be obeyed. If not otherwise regulated, the same provisions apply for Swisscom AG installations as generally apply in Switzerland.

Information and provisions concerning document naming (A4.0.2) and concerning the scope of inspections for installations as per NIV (A4.0.5), concerning documentation (A4.0.6), concerning the timing of notification (A4.0.7) and concerning signatures (A4.0.8) can be found in the respective appendices.

4.1.1 High voltage installations

A planning permission procedure is mandatory for high voltage installations of all types [4]. The planning permission must be submitted at an early date to the ESTI. Installations may only be implemented after a permit for the plan has been provided by the ESTI. The planning permission forms must be submitted to the following offices:

Original: ESTI
Copy: Person responsible for an electrical installation B3.2.4b;
Person responsible for an electrical installation B3.2.4h³⁶;
Customer.

The official forms of the ESTI must be used.

The ESTI generally checks within a year of completion whether the installation was built in accordance with the approved plans and whether the measures defined for protection of the environment were implemented.

The report on this inspection must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4b
Copy: Person responsible for an electrical installation B3.2.4h³⁶;
Customer.

³⁶ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

4.1.2 Permit holder for a low-voltage installation Art. 9 NIV

For all work falling under the NIV, such as new installations, changes or extensions, the authorisation holder must issue a safety dossier, consisting of at least one safety record with detailed measurement and testing report per system component/switchgear combination, and submit it to the following offices:³⁷

Original: Person responsible for an electrical installation B3.2.4h³⁸

Copy: Customer;
NIV central office;
Network operator.

The detailed process of safety record reporting can be found in Appendix A4.1.2.2.X.

The requirement documents for the safety dossier can be found in Appendix A4.1.2.3.

If required according to the technical connection conditions of the network operator, an installation notification must be sent in advance to the network operator. Installations may only be implemented after permission from the installation notification by the network operator. The process for installation notification reporting can be found in Appendix A4.1.2.1.X.

If Swisscom or a party appointed by Swisscom holds the function of network operator, an installation notification can be dispensed with if the following conditions are met:

- An agreement exists defining the maximum power draw,
- Regular or continuous monitoring of the agreed power draw,
- The responsibility for monitoring of the agreed power draw is clearly defined.

Processes must exist to ensure that the respective energy-supplying person responsible for an electrical installation receives the required safety dossier.

For the commissioning of low-voltage installations, the initial testing must always be carried out immediately. The results must be recorded in writing. The person responsible for an electrical installation B3.2.4h³⁸ reserves the right to request these results.

For installations requiring planning permission [4], these results must be submitted to the ESTI at an early time. Installations may only be implemented after a permit for the plan has been provided by the ESTI.

The network operator monitors the receipt of the safety records [6]. For installations with building infeed at network level 5, the address of the network operator is defined in the object-specific electrical safety concept.

The acceptance inspections must be carried out within 6 months after submission of the safety dossier. [6]

(SC) The independent inspection body is selected, commissioned and paid by Swisscom AG.

³⁷ (SC) Art. 24 paragraph 5 NIV "For work as per Art. 23 para. 2, item a NIV, the report from the initial testing is sufficient." does not apply.

³⁸ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

4.1.3 Low-voltage installation permit holder Art. 13 NIV, Art. 14 NIV and Art. 15 NIV

For all work on new installations as per permit pursuant to Art. 13 NIV, Art. 14 NIV or Art. 15 NIV, the permit holder must issue a safety dossier consisting of at least a list of the performed work. A copy of the safety dossier as well as the restricted permit must be submitted to:

Copy: Person responsible for an electrical installation B3.2.4h³⁹;
 SC project manager⁴⁰,
 Electro agent⁴¹

The acceptance inspections must be carried out within 6 months after submission of the safety dossier [6]. The independent inspection body is selected by Swisscom AG.

The accredited inspection agency responsible for the technical oversight is selected by the holder of the permit.

4.1.4 Switchgear combinations

For all supplied switchgear combinations, the manufacturer or supplier must issue a conformity declaration as well as the technical records (design verification and unit verification as per EN 61439) and submit these to the following offices:

Original: Person responsible for an electrical installation B3.2.4h³⁹
 Copy: Customer;
 NIV central office.

NOTE: For simple repairs and extensions (as per SNG 491000 - 3053), the “unit verification for simple repairs and extensions to low voltage switchgear combinations” A4.1.4 is sufficient.

4.1.5 Extra-low voltage installations

For extra-low voltage installations pursuant to Art. 8 Weak Current Ordinance [2], a planning permission procedure [4] is mandatory. The planning permission must be submitted at an early date to the ESTI. Installations may only be implemented after a permit for the plan has been provided by the ESTI. The planning permission forms must be submitted to the following offices:

Original: ESTI
 Copy: Person responsible for an electrical installation B3.2.4i;
 Customer.

The official forms of the ESTI must be used.

The ESTI generally checks within a year of completion whether the installation was built in accordance with the approved plans and whether the measures defined for protection of the environment were implemented.

³⁹ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

⁴⁰ Only for employees for whom Swisscom AG is not the permit holder

⁴¹ Only for Swisscom AG employees, required only once at the end of the year

The report on this inspection must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i

Copy: Customer

For extra-low voltage installations with a maximum operating voltage of 50 V AC or 120 V DC and an operating current exceeding 2 A, sections 4.1.2 and 4.1.3 apply. Telecommunications installations are subject to the special provisions of section 4.1.6.

For all other systems, a safety dossier consisting of at least a measurement report and corresponding conformity declarations for the extra-low voltage installations must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4h⁴² Copy: Customer

4.1.6 Telecommunications installations [1000]

4.1.6.1 New installations of primary, secondary and tertiary supply as per NIV

For all work on new installations of the primary, secondary and tertiary supply falling under the NIV, the authorisation holder must issue a safety dossier, consisting of at least one safety record with detailed measurement and testing report as per EN 62368 per system/component switchgear combination, and submit it to the following offices:⁴³

Original: Person responsible for an electrical installation B3.2.4i

Copy: Customer;
Network operator⁴⁴.

The detailed process of safety record reporting can be found in Appendix A4.1.6.2.x.

The requirement documents for the safety dossier can be found in Appendix A4.1.6.3.

4.1.6.2 New installations of the tertiary supply as per NEV

For all work on new installations of the tertiary supply as per NEV, between series feed distributors and telecommunications equipment as well as in compact systems (systems in which the power supply system and telecommunications equipment are housed in the same cabinet), a safety dossier, consisting of at least one measurement and testing report as per EN 62368 per system component/switchgear combination, must be issued and submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i

Copy: Customer

The requirement documents for the safety dossier can be found in Appendix A4.1.6.3.

⁴² For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

⁴³ (SC) Art. 24 paragraph 5 NIV "For work as per Art. 23 para. 2, item a NIV, the report from the initial testing is sufficient." does not apply.

⁴⁴ In systems with 1.5- or 10-year inspection cycle, the safety record is sent to the person responsible for an electrical installation after the acceptance inspection. In this respect, the person responsible for an electrical installation takes on the function of network operator and maintains a corresponding list.

4.1.6.3 New installations of hybrid cables

For all work on new installations of prefabricated hybrid cables that have not been manipulated and do not run through special rooms (damp; wet; risk of corrosion, fire or explosion; room groups 1 and 2 for medical use, etc.), a safety dossier, consisting of at least a measurement and testing report of the original manufacturer, must be issued and submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i Copy: Customer

NOTE: For all other cases, the rules for new installations of primary, secondary and tertiary supply as per NIV (4.1.6.1) apply.

4.1.6.4 New installation as per StV

For all work on new installations as per StV, a safety dossier, consisting of at least one detailed measurement and testing report as per EN 62368 per system component/switchgear combination, must be issued and submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i Copy: Network operator⁴⁵

4.1.6.5 Installation notifications

For telecommunications installations ≤ 10 kW, an installation notification can be dispensed with. Processes must exist to ensure that the respective person responsible for an electrical installation receives the required safety dossier. [1005]

For telecommunications installations > 10 kW, an installation notification must be sent to the person responsible for an electrical installation in advance. In this respect, the person responsible for an electrical installation takes on the function of network operator. The installations may only be implemented after permission from the installation notification by the person responsible for an electrical installation. The process for installation notification reporting can be found in Appendix A4.1.6.1.

4.1.6.6 Inspections

For the commissioning of telecommunications installations, the initial testing must always be carried out immediately. The results must be recorded in writing. The person responsible for an electrical installation as per the personnel assignment list of the object group- or object-specific electrical safety concept reserves the right to request these results.

The person responsible for an electrical installation monitors the receipt of the safety dossier.

The acceptance inspections must be carried out within 6 months after submission of the safety dossier[6]. The independent inspection body is selected by Swisscom AG.

For installations that require only a test report as per EN 62368, no acceptance inspection is required. Swisscom AG reserves the right to commission an independent inspection body to review the conformity with the accepted principles of engineering.

⁴⁵ In this respect, the person responsible for an electrical installation takes on the function of network operator and maintains a corresponding list

For new installations as per NIV in the tertiary supply in small objects (PUS-IN, AVE) as well as hybrid cables, a general acceptance inspection as per NIV can be dispensed with due to the minimal risk. In place of the general acceptance inspection, Swisscom AG commissions spot check acceptance inspections per region and installing company covering at least 10% of the new installations. [1003]

The Swiss Federal Inspectorate for Heavy Current Installations (ESTI) monitors the person responsible for an electrical installation and carries out random checks annually.

4.1.7 Lightning protection installations

The builder must prepare the following documents with the specified information for each newly built lightning protection system and submit them to the competent office [32][33]:

- a. The positioning of natural and artificial conductors for external lightning protection, including metallic lines running in from the outside and the connections to the protective equipotential bonding;
- b. The positioning of the earthing system;
- c. Materials and dimensions of the conductors used;
- d. Information on components such as concrete reinforcement, façade elements and the like that are integrated into the external lightning protection;
- e. Calculations for the LPS (separating distances, rolling sphere radii, shielding angle, etc.)
- f. Reports on the completed inspections and earthing measurements [35].

The documents must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4h⁴⁶

Copy: Customer;
NIV central office;
Local fire safety authorities.

The acceptance inspections must be carried out within 6 months after submission of the documents. The lightning protection expert is appointed by the local fire safety authority or Swisscom AG.

⁴⁶ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

4.2 Electrical safety record for existing installations

For locations outside Switzerland, the respective national regulations and authorities must be obeyed. If not otherwise regulated, the same provisions apply for Swisscom AG installations as generally apply in Switzerland.

Information and provisions concerning document naming (A4.0.2) and concerning the scope of inspections for installations as per NIV (A4.0.5), concerning documentation (A4.0.6), concerning the timing of notification (A4.0.7) and concerning signatures (A4.0.8) can be found in the respective appendices.

4.2.1 High voltage installations

High voltage installations must be continuously maintained and regularly cleaned and inspected. [3]

In particular, it must be checked whether:

- a. The installations and the connected electrical equipment are in flawless condition;
- b. The installations correspond to the regulations with regard to subdivisions, arrangement and short-circuit strength;
- c. The protective equipment is correctly configured and effective;
- d. Any changes have occurred in the area of the installations that reduce the level of safety;
- e. System schematics, designations and labels are present and up-to-date.

Inspection cycle for Swisscom AG installations: 5 years

The person responsible for an electrical installation B3.2.4b or a third party commissioned by him creates an inspection report for every inspection. This contains an assessment of the installations and records, in particular, the ordered measures and times for their completion as well as the type and times of the actual performance. The completed inspection reports must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4b

Copy: Delegated proprietor B3.2.1c;
NIV central office.

4.2.2 Low voltage installations

Low voltage installations must be continuously maintained and regularly cleaned and inspected. [6]

For the regular inspection of low voltage installations as per NIV, the network operator orders the proprietor to provide verification of the safety of the electrical installations 6 months before the end of the inspection cycle. [6]

The inspections are carried out by the contract partner “independent inspection body” for the corresponding object or district.

Inspection cycles for Swisscom AG installations:

Installation	Ordinance	Inspection cycle
Data centres	NIV	5 years
Backbone office	NIV	5 years
Central Office	NIV	10 years
Local office (PUS-IN, PUS-OC, PUS-IC)	NIV	10 years
RPF (> 60 V DC) on public grounds	StV [1004]	5 years
RPF (> 60 V DC) in objects	StV[1004]	Same inspection cycle as the energy-supplying installation Maximum of 10 years
RPF (< 60 V DC)	NIV	Same inspection cycle as the energy-supplying installation Maximum of 10 years
Cellular base stations and antennas	NIV	10 years
Cellular base stations and antennas on high voltage towers ⁴⁷	NIV	5 years
Broadcasting transmission installations	NIV	10 years
Battery rooms	NIV	Same inspection cycle as the installation supplied with energy

Table 4.2.2: Inspection cycles

For the remaining installations, the inspection cycles as per NIV apply.

For systems with building infeed at network level 5, a installation data file with the corresponding inspection cycles is created in consultation between the person responsible for an electrical installation B3.2.4h⁴⁸ and the contract partner “independent inspection body”. Regular inspections in these installations are carried out according to this installation data file. The data are provided to the network operator for entry into the IT system. The network operator monitors the receipt of the safety records.

For all inspections of existing installations, the independent inspection body must issue a safety dossier, consisting of at least one safety record with detailed (every circuit must be individually listed on the measurement report) measurement and testing report per system component/switchgear combination, and submit this to the following offices:

Original: Person responsible for an electrical installation B3.2.4h⁴⁸

Copy: NIV central office;

Network operator.

The detailed process of safety record reporting can be found in Appendix A4.2.2.

The requirement documents for the safety dossier can be found in Appendix A4.1.2.3.

⁴⁷ may only be inspected by an accredited inspection body [6]

⁴⁸ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

4.2.3 Extra-low voltage installations

Extra-low voltage installations must be continuously maintained and regularly cleaned and inspected. For extra-low voltage installations subject to the Weak Current Ordinance, the following provisions apply: Scope of the inspection:

- a. The installations and the connected electrical equipment are in flawless condition;
- b. The protective equipment is effective;
- c. Any changes have occurred in the area of the installations that reduce the level of safety;
- d. System schematics, designations and labels are present and up-to-date.

Inspection cycle for Swisscom AG installations: 10 years

The ESTI creates an inspection report for every inspection. This contains an assessment of the installations and records, in particular, the ordered measures and times for their completion as well as the type and times of the actual performance. The completed inspection reports must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i

For extra-low voltage installations with a maximum operating voltage of 50 V AC or 120 V DC and an operating current exceeding 2 A, section 4.2.2 applies. Telecommunications installations are subject to the special provisions of section 4.2.4.

4.2.4 Telecommunications installations [1000]

Telecommunications installations must be continuously maintained and regularly cleaned and inspected.

The inspection of the primary, secondary and tertiary supply, if present, is carried out together with the inspection of the low voltage installation as per NIV. Excepted from this is the tertiary supply between the series feed distributor and the telecommunications installations as well as compact installations (installations in which power supply system and telecommunications installations are housed in the same cabinet).

The inspections are carried out by the contract partner “independent inspection body” for the corresponding object or district.

The inspection cycles are based on the objects, which are listed in Table 4.2.2.

For all inspections of existing installations as per NIV, the independent inspection body must issue a safety dossier, consisting of at least one safety record with detailed measurement and testing report as per EN 62368 per system component/switchgear combination, and submit this to the following offices:

Original: Person responsible for an electrical installation B3.2.4i Copy: Network operator⁴⁹

The detailed process of safety record reporting can be found in Appendix A4.2.4.

The requirement documents for the safety dossier can be found in Appendix A4.1.6.3.

⁴⁹ In this respect, the person responsible for an electrical installation takes on the function of network operator and maintains a corresponding list.

NOTE: A transitional period of one inspection cycle (10 years) as of 1 January 2017 is allowed for the safety record for existing installations.⁵⁰

For all inspections on existing installations as per StV, a safety dossier, consisting of at least one detailed measurement and testing report as per EN 62368 per system component/switchgear combination, must be issued and submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4i Copy: Network operator⁵¹

The Swiss Federal Inspectorate for Heavy Current Installations (ESTI) monitors the person responsible for an electrical installation and carries out random checks annually.

4.2.5 Lightning protection installations

External lightning protection installations must be continuously maintained and inspected. [33]

Inspection cycles for Swisscom AG installations:

Installation	Inspection cycle
Data centres and backbone office	5 years
Other installations	10 years

Table 4.2.5: Inspection cycles

For the regular inspection of lightning protection installations, the nominated person in control of an electrical installation during work activities⁵² issues the inspection order to the lightning protection expert in consultation with the local fire safety authority 6 months before the end of the inspection cycle.

The completed inspection reports with technical documentation must be submitted to the following offices:

Original: Person responsible for an electrical installation B3.2.4h⁵³

Copy: Customer;
Local fire safety authorities.

NOTE 1: The internal lightning protection (lightning protection equipotential bonding) must be inspected together with the inspection as per NIV. The inspection cycles in section 4.2.2 apply, with a maximum of 10 years.

NOTE 2: The internal lightning protection (lightning protection equipotential bonding) of telecommunications installations is inspected by spot checks every 5 years.

⁵⁰ As per ESTI decision [1000]

⁵¹ In this respect, the person responsible for an electrical installation takes on the function of network operator and maintains a corresponding list

⁵² This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

⁵³ For installations as per 2.1.1.1: the nominated person in control of an electrical installation during work activities B3.2.5c

4.3 Maintenance

The person responsible for an electrical installation holds the maintenance responsibility for all electrical installations. He ensures that the corresponding maintenance activities are planned and carried out. He maintains a list about these activities.

4.3.1 Maintenance planning

The person responsible for an electrical installation creates a maintenance plan. Maintenance software is used to assist with the planning. The systems and installations for which maintenance activities are planned are entered in this software along with the corresponding cycle periods. The minimum requirements for the maintenance planning are defined in Appendix A4.3.1 and must be implemented accordingly.

NOTE: No preventive maintenance is required on remote power systems > 60 V DC due to the continuous monitoring; only corrective maintenance is carried out.

4.3.2 Eliminating dangers

If dangerous conditions are identified during maintenance work, the necessary measures must be taken immediately to ensure that no one is at risk of injury or death. At the same time, the nominated person in control of an electrical installation during work activities⁵⁴ and/or electro agent of the corresponding organisational unit must be informed.

4.4 Protective equipment

Technical measures have significant potential to reduce risk and prevent accidents. Every person active in the area of application of this concept – whether employed or working on behalf of a third party company – who observes that protective equipment is missing or functionally impaired must immediately take action to correct such defects. If this person is not capable of doing this, a notification must be sent immediately to the nominated person in control of an electrical installation during work activities⁵⁴ and/or electro agent of the corresponding organisational unit.

⁵⁴ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

4.5 Energy management

Energy management lies within the area of responsibility of the corresponding organisational unit of the proprietor. This includes monitoring, analysing, reporting and improving the energy efficiency of high-availability installations. [23]

The goal of energy management is the monitoring, analysis and improvement of the energy efficiency of the data centre as well as the associated reporting. [23]

To safely and efficiently operate a high availability installation, the following information is required for all defined measurement points:

- a. Voltage quality;
- b. Energy consumption per phase conductor [23]

Reporting is required at least once per quarter. In addition to the information listed above, this reporting must include the capacity utilisation of the installations given in percent.

For redundant installations, the possible capacity utilisation of the installations in the event of a failure of a redundant supply source must be ensured.

For the event of a local, a national or international energy deficit, corresponding load-shedding concepts must be prepared and applied to ensure that telecommunications operations can be continued for as long as possible.

The network quality as per EN 50160 in the primary and secondary supply must also be monitored and verified. The network quality as per EN 61000-2-4 class 1 in the tertiary supply must be monitored and verified. In the event of incidents outside of the listed standards, reporting with justification is required. Reporting on the network quality is required once per year.

4.6 Cyber security [100]

The internet connects people, machines, technology and economies as never before. The possibilities as well as the associated threats are the result of countless technical innovations and the new applications and services built atop these innovations. The current threat landscape is complex and changes continuously [100]. The increasing use of industrial control systems (ICS/SCADA) in objects with high-availability installations requires far-sighted management of these systems along with corresponding risk assessments. The threats to such systems come in part from actors working in a concerted fashion:

- State actors and intelligence services;
- Terrorists;
- Organised crime;

And from opportunistic actors:

- Criminals;
- Hacktivists, groups;
- Vandals, script kiddies.

In order for the industrial control systems in objects with high-availability installations to satisfy the highest possible security standard, they must be created, maintained and operated according to the following criteria:

- In principle, only industrial control systems without even a single connection to other installations of any kind may be used;
- The operators of the networks must ensure that corresponding concepts exist for prompt security updates to the operating systems and software and that these are implemented consistently;
- Updates or changes to industrial control systems may only take place if the function and compatibility were tested in detail in advance;
- Devices not permanently integrated into the network, such as laptops, tablets, smartphones and storage media of all kinds, may only be connected to the industrial control system if these were not previously connected to any other networks. Otherwise, a comprehensive and verifiable security inspection of the devices must take place before the connection is established;
- Remote access to industrial control systems is generally prohibited. Exceptions are only permitted after careful inspection and permission by Swisscom Group Security;
- For the event of failures of industrial control systems, corresponding emergency plans must be prepared to allow safe operation of the technical infrastructure even without the industrial control system.

4.7 ESD protection

Electrostatic charges arise nearly everywhere in everyday life. Electrostatic discharges are only perceptible to humans as of a certain strength.

Nearly all electrical, electronic and opto-electronic components are at risk of damage from electrostatic discharge. Many electro-mechanical components also fall within this category. All such components can be functionally impaired or destroyed by electrostatic discharges.

To maintain the availability of the installations, the accepted principles of engineering [29] as well as internal guidelines [102] are implemented.

The implementation, inspection and auditing of the ESD preventive measures is the responsibility of the corresponding organisational units and is not covered by this document.

4.8 Planning of measures

The issues defined in sections 4.1 to 4.4 must be compiled into a plan of measures, and the implementation of this plan must be monitored. The planning of measures relating to electrical safety takes place independently and is not part of the measures for work safety and protection of health. The nominated person in control of an electrical installation during work activities⁵⁵ is responsible for the plan of measures and its implementation.

⁵⁵ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

5 Concluding provisions

By signing the electrical safety concept, the proprietor declares his agreement with the concept and confirms the correctness of its content.

5.1 Changes

The signature rule above applies in the event of fundamental changes⁵⁶ to the main document.

Changes to appendices, authorisations and rules as well as changes in the main document resulting from changes to laws, ordinances or standards that do not impact entire sections or processes, changes to tables and charts as well as changes consisting of more detailed specifications do not require another signing according to the above signature rule.

Changes may only be made by the Swisscom AG electrical safety officer or persons authorised by him.

The Swisscom AG electrical safety officer is responsible for changes to this document.

For supplements and referencing documents that concern the entire company (organisational chart, emergency organisation, etc.), the currently valid version always applies.

5.2 Versioning

The versioning of the electrical safety concept takes place as follows:

Number	Meaning	Document change
First number (1.X.X)	Main version number	Fundamental change ⁵⁶ in the main document
Second number (X.1.X)	Secondary version number Main document	Other change in the main document
Third number (X.X.1)	Secondary version number Appendices, authorisations, rules	Changes in appendices, authorisations and rules

Table 5.2: Versioning

⁵⁶ Fundamental changes are changes to entire sections and processes.

5.3 Auditing

The implementation of the processes, requirements and rules in the area of application of this electrical safety concept is evaluated in a dynamic quality assurance process under the direction of the Swisscom AG electrical safety officer. External parties may be included in this. Multiple audits are carried out every year. The results must always be recorded in writing.

5.4 Sanctions

In the event of violations of the provisions of this electrical safety concept, Swisscom AG or the FM provider reserves the right to issue sanctions against culpable employees as well as persons working for a third party company. These are defined in consultation with the electrical safety officer or electro agent (as well as the relevant supervisor and Human Resources department in the case of internal employees) according to the following scheme:

1. Incident: Oral or written warning
2. Incident: Written warning
3. Incident: Revocation of the access authorisation or termination of the existing contract relationship. Swisscom AG reserves the right to ban persons from its premises.

In the case of gross negligence, the access authorisation can be immediately revoked, or the existing contract relationship terminated. Swisscom AG reserves the right to ban persons from its premises.

5.5 Distribution list

The approved electrical safety concept and subsequent revisions are distributed to the persons defined below:

- Proprietor (B3.2.1a),
- Person responsible for an electrical installation of low and extra-low voltage infrastructure installations (B3.2.4c),
- Swisscom AG electrical safety officer (B3.2.2a),
- Swisscom Broadcast AG electrical safety officer (B3.2.2b),
- FM provider Electrical safety officer (B3.2.2c).

Distribution within the organisational units is the responsibility of the proprietor and person responsible for an electrical installation.

5.5.1 Publication

The currently valid version of the approved electrical safety concept is published at:

www.swisscom.ch/electro

5.6 Approval of the document

5.6.1 Swisscom AG

Approval of the electrical safety concept is issued upon signing by the persons listed below. These signatures are issued in accordance with the respective function/role. The electrical safety concept enters into force upon signing by the proprietor and the Swisscom AG electrical safety officer.

**Proprietor
Swisscom AG**

Head of Group Security
Philippe Vuilleumier

16.6.2021

Date



Signature

**Swisscom AG electrical safety
officer**

Group Security
Physical Security & Safety SC
Michael Knabe

23.06.2021

Date



Signature

5.6.2 Swisscom Broadcast AG

Approval of the electrical safety concept is issued upon signing by the persons listed below. These signatures are issued in accordance with the respective function/role. The electrical safety concept enters into force upon signing by the proprietor and the Swisscom Broadcast AG electrical safety officer.

Proprietor

Swisscom Broadcast AG

Head of Network and IT and
Operations

Andreas Weibel

15.06.2021

Date



Signature

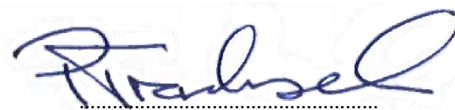
Electrical safety officer

Swisscom Broadcast AG

Peter Trachsel

18.6.2021

Date



Signature

A Appendices

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A1.2 Responsibility, maintenance, operation and verification of safety

Unless otherwise regulated by contract, the following principles apply with regard to the responsibility, maintenance, operation and safety verification of electrical installations:

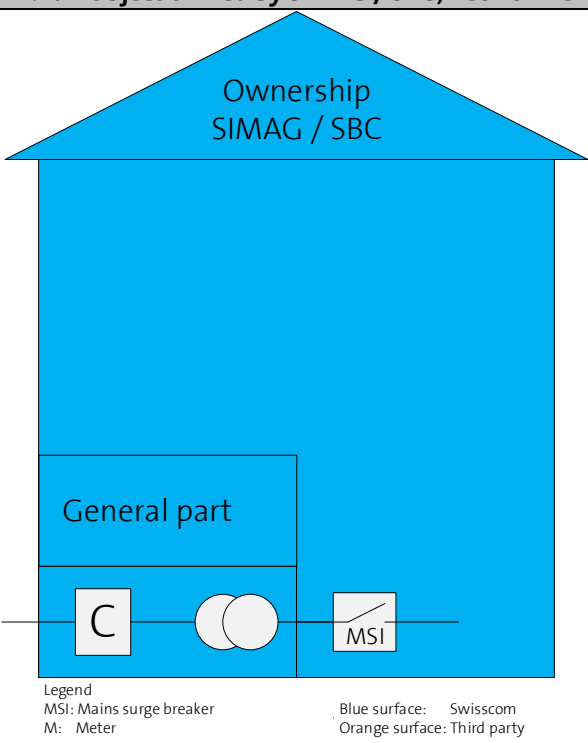
A1.2a1 Object owned by SIMAG / SBC; network level 5; without third party lessee	
 <p>Ownership SIMAG / SBC</p> <p>General part</p> <p>Legend MSI: Mains surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	<p>Swisscom power draw network level</p> <p>NL 5</p>
	<p>Swisscom responsibility, maintenance and operation</p> <p>Entire installation From the meter</p>
	<p>Swisscom network operator duties</p> <p>Entire installation as site network operator (Swisscom or company contracted by Swisscom)</p>
	<p>Verification of safety Swisscom</p> <p>Entire installation</p>

Table A1.2a1: Object owned by SIMAG / SBC; network level 5; without third party lessee

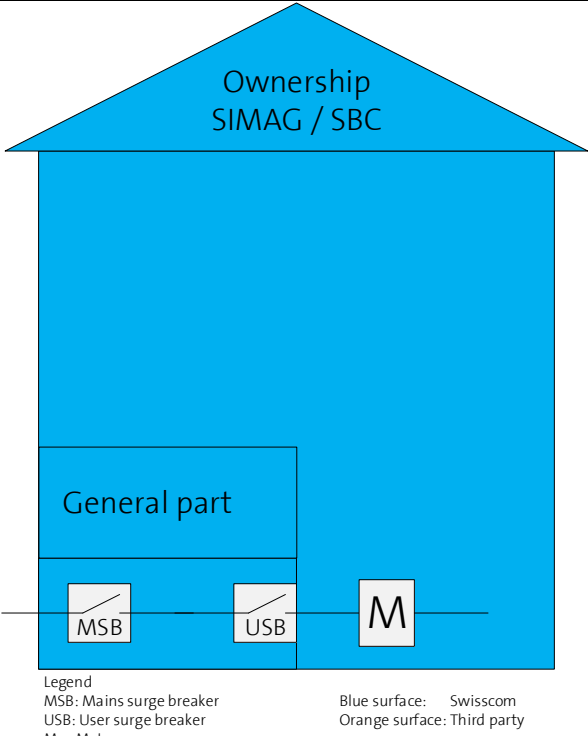
A1.2a2 Object owned by SIMAG / SBC; network level 7; without third party lessee		
 <p>Ownership SIMAG / SBC</p> <p>General part</p> <p>MSB USB M</p> <p>Legend MSB: Mains surge breaker USB: User surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NE7
	Swisscom responsibility, maintenance and operation	Entire installation from connection surge interrupter
	Swisscom network operator duties	None Responsibility of local distribution network operator
	Verification of safety Swisscom	Entire installation

Table A1.2a2: Object owned by SIMAG / SBC; network level 7; without third party lessee

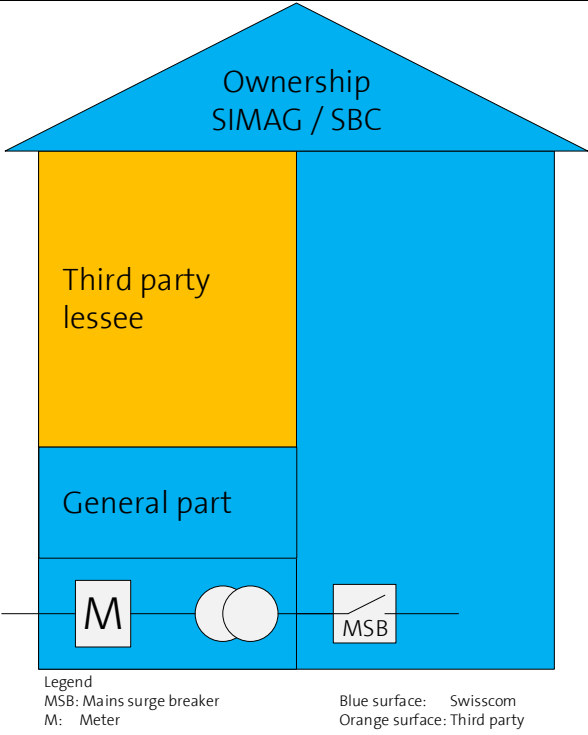
A1.2b1 Object owned by SIMAG / SBC; network level 5; with third party lessee		
 <p>Legend MSB: Mains surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NL 5
	Swisscom responsibility, maintenance and operation	Entire installation From the meter Excluding space leased to third party
	Swisscom network operator duties	Entire installation as site network operator (Swisscom or company contracted by Swisscom)
	Verification of safety Swisscom	Entire installation Space leased to third party: Inspection and correction of deficiencies is the responsibility of the lessee. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV.

Table A1.2b1: Object owned by SIMAG / SBC; network level 5; with third party lessee

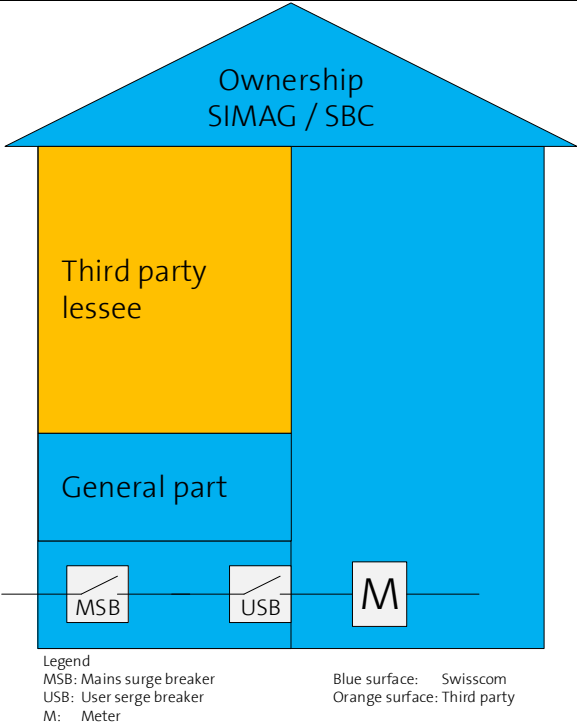
A1.2b2 Object owned by SIMAG / SBC; network level 7; with third party lessee		
 <p>Ownership SIMAG / SBC</p> <p>Third party lessee</p> <p>General part</p> <p>MSB USB M</p> <p>Legend MSB: Mains surge breaker USB: User surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NE7
	Swisscom responsibility, maintenance and operation	Entire installation from connection surge interrupter Excluding space leased to third party
	Swisscom network operator duties	None Responsibility of local distribution network operator
	Verification of safety Swisscom	Entire installation Space leased to third party: Inspection and correction of deficiencies is the responsibility of the lessee.

Table A1.2b2: Object owned by SIMAG / SBC; network level 7; with third party lessee

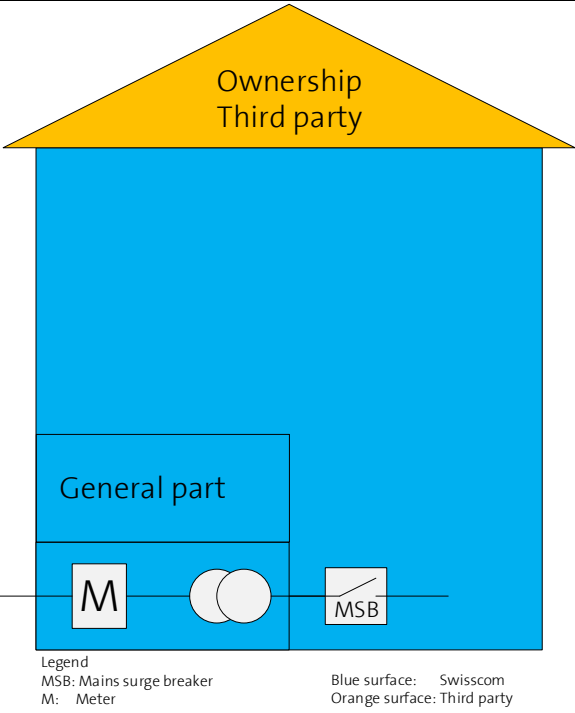
A1.2c1 Object owned by third party; network level 5; without third party lessee		
 <p>Ownership Third party</p> <p>General part</p> <p>M</p> <p>MSB</p> <p>Legend MSB: Mains surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NL 5
	Swisscom responsibility, maintenance and operation	Entire installation From the meter Incl. network level 5 installations from meter
	Swisscom network operator duties	Entire installation as site network operator (Swisscom or company contracted by Swisscom)
	Verification of safety Swisscom	Entire installation General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV.

Table A1.2c1: Object owned by third party; network level 5; without third party lessee

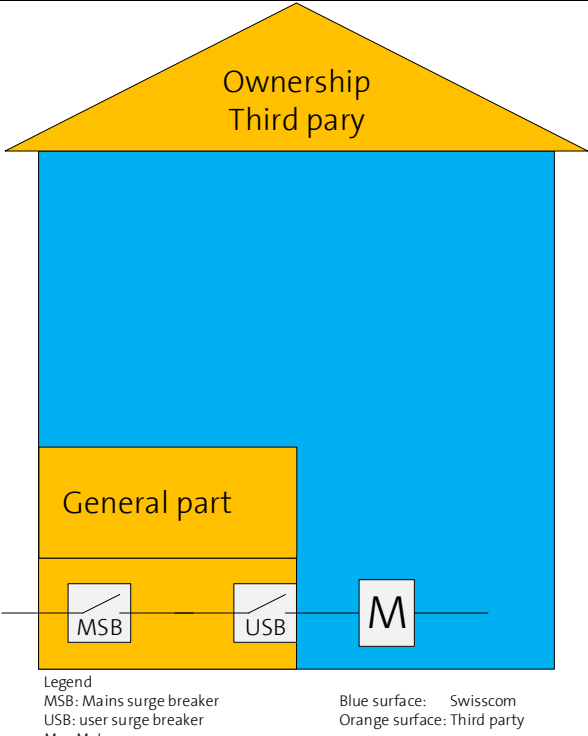
A1.2c2 Object owned by third party; network level 7; without third party lessee		
 <p>Ownership Third party</p> <p>General part</p> <p>MSB USB M</p> <p>Legend MSB: Mains surge breaker USB: user surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NL 7
	Swisscom responsibility, maintenance and operation	Entire installation from recipient surge interrupter Excluding general space
	Swisscom network operator duties	None Responsibility of local distribution network operator
	Verification of safety Swisscom	Entire installation from recipient surge interrupter General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner.

Table A1.2c2: Object owned by third party; network level 7; without third party lessee

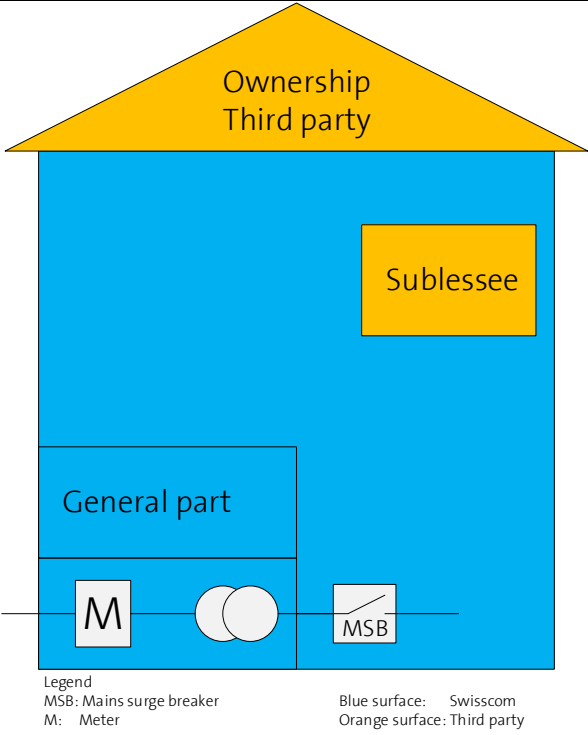
A1.2d1 Object owned by third party; network level 5; with sublessee		
 <p>Legend MSB: Mains surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NE5
	Swisscom responsibility, maintenance and operation	Entire installation From the meter Incl. network level 5 installations from meter Excluding subleased space
	Swisscom network operator duties	Entire installation as site network operator (Swisscom or company contracted by Swisscom)
	Verification of safety Swisscom	Entire installation General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV. Sublessee space: Inspection and correction of deficiencies is the responsibility of the lessee. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV.

Table A1.2d1: Object owned by third party; network level 5; with sublessee

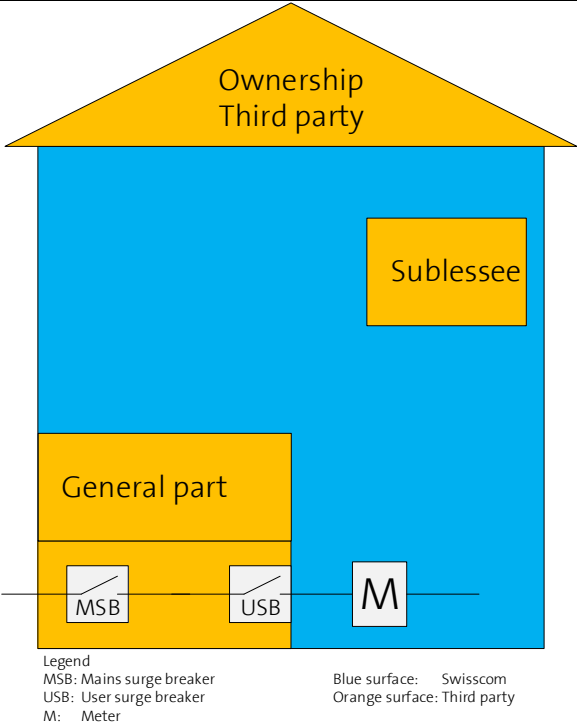
A1.2d2 Object owned by third party; network level 7; with sublessee		
 <p>Ownership Third party</p> <p>Sublessee</p> <p>General part</p> <p>MSB USB M</p> <p>Legend MSB: Mains surge breaker USB: User surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NL 7
	Swisscom responsibility, maintenance and operation	Entire installation from recipient surge interrupter Excluding general space and subleased space
	Swisscom network operator duties	None Responsibility of local distribution network operator
	Verification of safety Swisscom	Entire installation from recipient surge interrupter General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner. Sublessee space: Inspection and correction of deficiencies is the responsibility of the lessee.

Table A1.2d2: Object owned by third party; network level 7; with sublessee

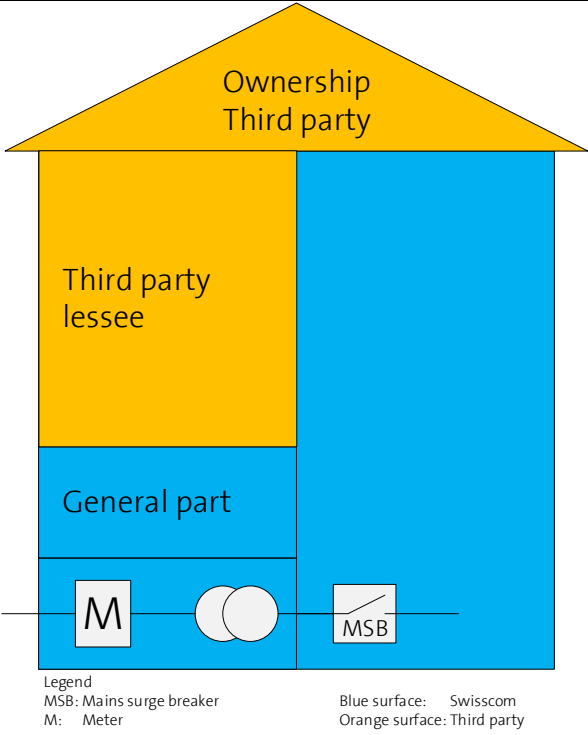
A1.2e1 Object owned by third party; network level 5; with third party lessee		
 <p>Ownership Third party</p> <p>Third party lessee</p> <p>General part</p> <p>M</p> <p>MSB</p> <p>Legend MSB: Mains surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NE5
	Swisscom responsibility, maintenance and operation	Entire installation From the meter Incl. network level 5 installations from meter Excluding space leased to third party
	Swisscom network operator duties	Entire installation as site network operator (Swisscom or company contracted by Swisscom)
	Verification of safety Swisscom	Entire installation General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV. Third party lessee space: Inspection and correction of deficiencies is the responsibility of the lessee. The site network operator only carries out the tasks as per Art. 33 NIV and Art. 36 NIV.

Table A1.2e1: Object owned by third party; network level 5; with third party lessee

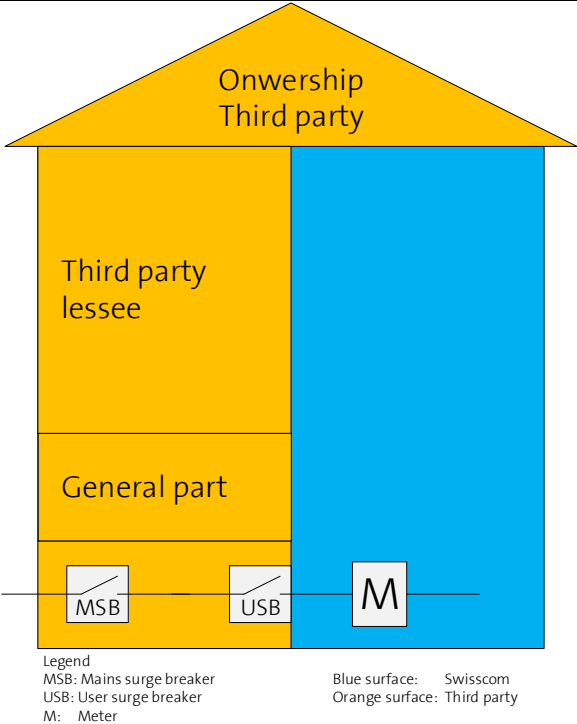
A1.2e2 Object owned by third party; network level 7; with third party lessee		
 <p>Onwership Third party</p> <p>Third party lessee</p> <p>General part</p> <p>MSB</p> <p>USB</p> <p>M</p> <p>Legend MSB: Mains surge breaker USB: User surge breaker M: Meter</p> <p>Blue surface: Swisscom Orange surface: Third party</p>	Swisscom power draw network level	NL 7
	Swisscom responsibility, maintenance and operation	Entire installation from recipient surge interrupter Excluding general space and space leased to third party
	Swisscom network operator duties	None Responsibility of local distribution network operator
	Verification of safety Swisscom	Entire installation from recipient surge interrupter General space: Inspection and correction of deficiencies is the responsibility of the electrical installation owner. Third party lessee space: Inspection and correction of deficiencies is the responsibility of the lessee.

Table A1.2e2: Object owned by third party; network level 7; with third party lessee

A1.7 E+E Terms

A1.7.1.3 E+E Complex installation

Examples of primary and secondary supply:

- Electrical main distribution board with energy supply directly from the transformer;
- Electrical main distribution frame with energy supply directly from an emergency power system with an automatic switching device;
- Electrical subdistribution frames that supply energy to distribution circuits, and the electrical main distribution frame is supplied with energy directly from the transformer;
- Electrical subdistribution frames that supply energy to distribution circuits, and the electrical main distribution frame is supplied with energy directly from an emergency power system with automatic switching device;

Mobile emergency power groups with manual switching “network-0-emergency power system” are not complex installations.

Examples of high-availability installations with multiple infeeds:

- Data centre with A and B network, A and +1 network, normal and UPS network and the like,
- Transmission points with A and B network, A and +1 network, normal and UPS network and the like.

In the text below, highly complex installations or installations with insufficient documentation may also be considered complex installations.

A1.7.1.5 E+E Infrastructure installations

Examples:

- Main distribution and substation, energy distribution network;
- Emergency power, NoBreak, UPS, emergency lighting, evacuation facilities;
- Ventilation and air-conditioning installations;
- Light and power socket circuits.

A1.7.4.13 E+E Formal approval

Explanations:

- A formal approval is issued by the respective delegated person responsible for an electrical installation for the object / object group to the nominated person in control of an electrical installation during work activities. Excepted from this are installations with organisation 2.1.1.1.
- The formal approval is a purely administrative approval and is not considered authorisation.
- Only the order location, the installation and the execution time are checked and approved.

A1.7.4.14 E+E Authorisation

Explanation:

- The authorisation is issued exclusively by the respective nominated person in control of an electrical installation during work activities to the nominated person in control of a work activity.
- The authorisation includes the formal approval (A1.7.4.13 E+E) as well as the installation, safety and work safety permission.

A1.7.4.15 E+E Permission to start work

Explanation:

- The permission to start work is issued exclusively by the respective nominated person in control of a work activity to the employees of the working team.

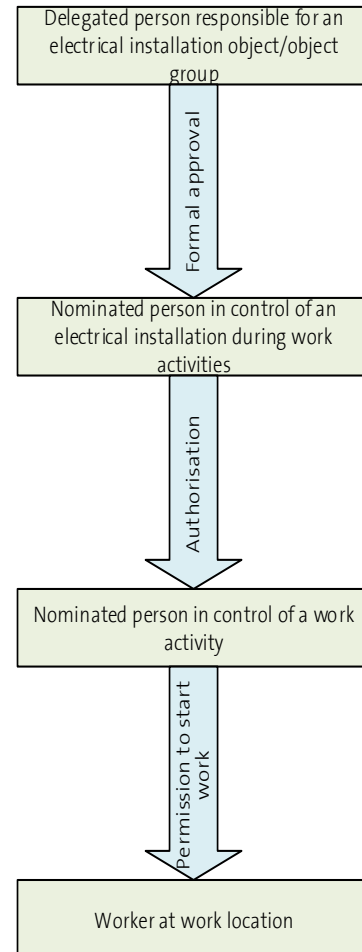


Chart A1.7.4.13 E+E: Approvals and authorisation

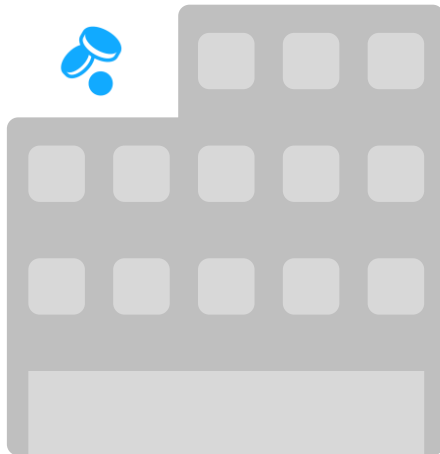
A1.7.7 E+E Ownership and possession

Explanation:

The features differentiating the ownership and possession of real estate and electrical installations are explained below.

The real estate owner can be the owner of the electrical installation, unless a real estate possessor was responsible for financing the electrical installations, in which case the latter is owner of the electrical installation.

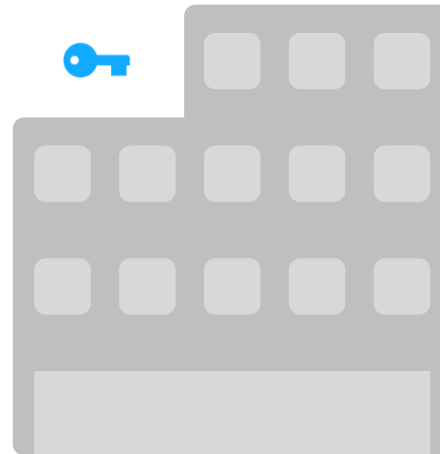
Real estate owner



Features:

- Financing of the real estate
- Generally with land register entry

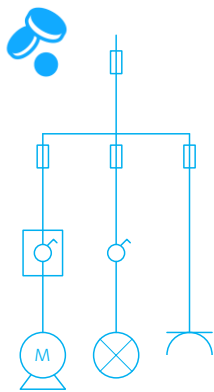
Real estate possessor



Features:

- Right to control access to the real estate
- May be owner or lessee

Electrical installations owner

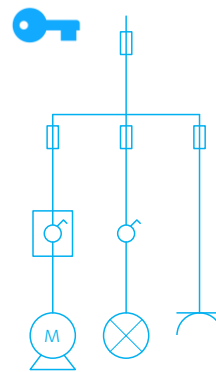


Devices Light Socket

Feature:

- Financing of the electrical installations
- May be owner or lessee of the real estate

Electrical installation proprietor



Devices Light Socket

Features:

- Right to control access to the electrical installations
- May be owner or lessee

APPENDICES

AUTHORISATIONS

RULES

Template document: www.swisscom.ch/electro

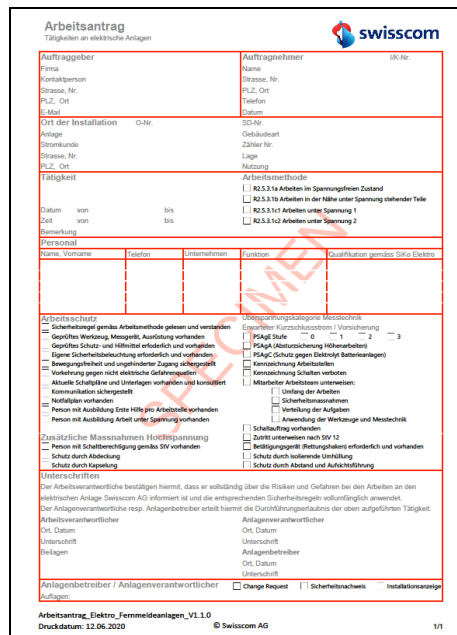
A2.5.2 Work applications

Work application for high, low and extra-low voltage



Form A2.5.2a: Work application for high, low and extra-low voltage

Work application for telecommunications installations 48 V DC



Form A2.5.2b: Work application for telecommunications installations

Current specification documents: www.swisscom.ch/electro

A2.5.3 Risk assessment

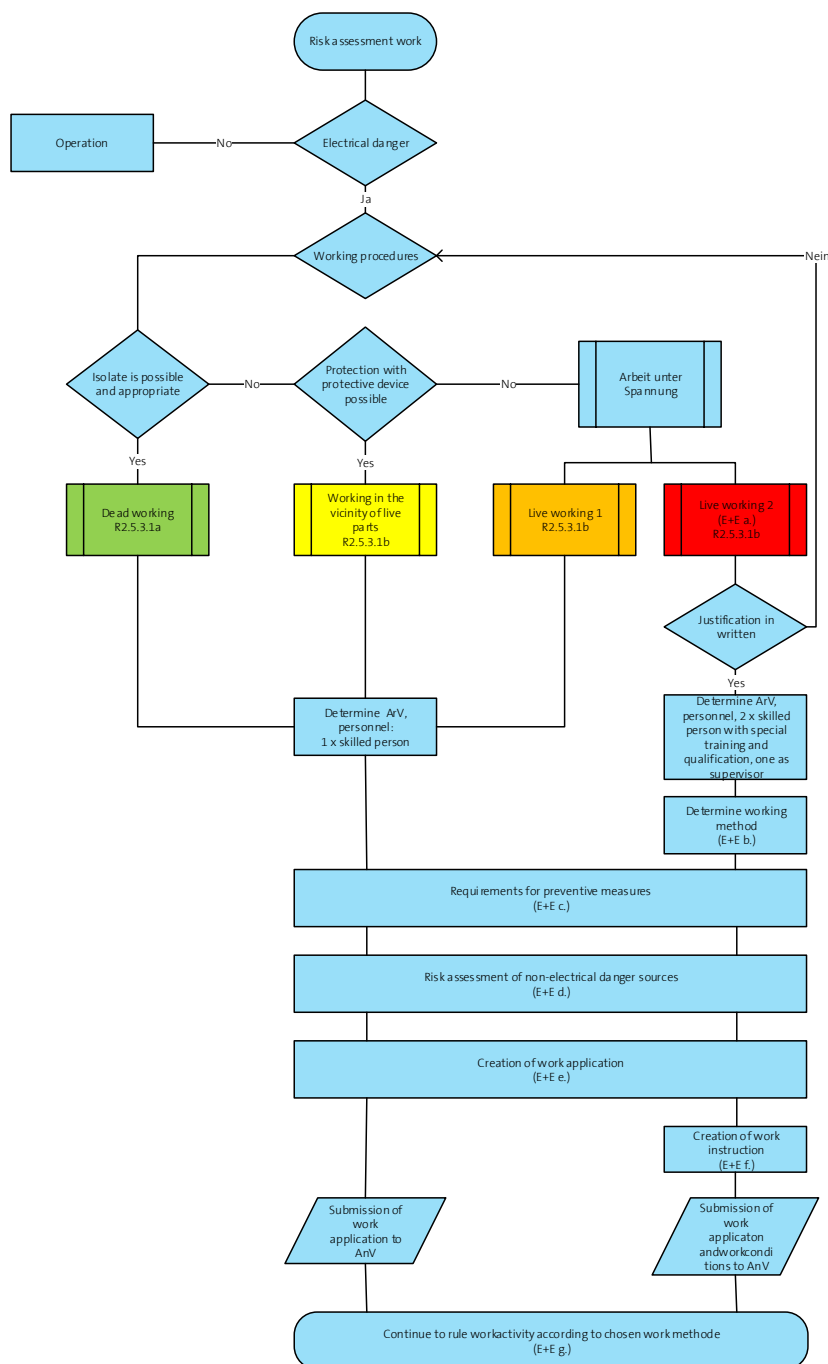


Chart A2.5.3: Risk assessment flow chart [19][40][44]

A2.5.3 E+E Risk assessment

- a. **SC** Live working 2
 - Requirements for high voltage:
 - Work prohibited;
 - Requirements for low voltage:
 - Work on installations with PPE-E protection level (equivalent electric arc energy) > 318 kJ prohibited;
 - Work on installations with PPE-E protection level (equivalent electric arc energy) < 318 kJ prohibited for employees of Swisscom AG and FM provider;
 - Work on remote power feeding mCAN is prohibited.
 - Requirements for extra-low voltage:
 - Work on installations with PPE-E protection level (equivalent electric arc energy) > 318 kJ prohibited;
 - Work on installations with PPE-E protection level (equivalent electric arc energy) < 318 kJ prohibited for employees of Swisscom AG and FM provider.
- b. Requirements for working methods [19]
 - Safe clearance working;
 - Insulating glove working;
 - Work on potential.
- c. Requirements for preventive measures [19]
 - Requirements for PPE-E as per A3.3.2;
 - Requirements for installation preventive measures; e.g. mobile protection against electric arcs.
- d. Risk assessment of non-electrical danger sources [19]
 - Weather;
 - Illumination;
 - Work height;
 - Work location;
 - Mechanical or pressurised system;
 - etc.
- e. Creation of work application (A2.5.2)
 - Precise description of the work;
 - Result of the risk assessment;
 - Additional switching order required for high voltage installations and complex low and extra-low voltage installations;
 - No written work application required for simple work;
 - Installation notification (if required as per technical connection conditions)⁵⁷.
- f. Creation of work instruction [19]

⁵⁷ An installation notification must always be created for extensions or new installations of telecommunications installations

- Relationship of nominated person in control of an electrical installation during work activities, nominated person in control of a work activity and personnel doing the work;
 - Measure to limit switching over-voltages;
 - Working distances for persons and conductive devices.
- g. Continue with work as per selected working procedures
- nominated person in control of an electrical installation during work activities issues authorisation for work application⁵⁸.

⁵⁸ For live working 2, the authorisation of the person responsible for an electrical installation is also required

A2.5.3.1 Vicinity and live working zone

A2.5.3.1.1 High voltage

- a. Distance in air and zones for work

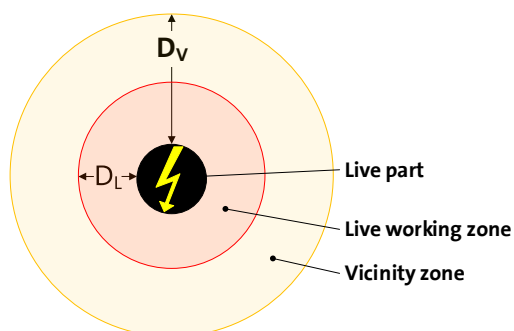


Chart A2.5.3.1.1a: Vicinity and live working zone, distance in air and zones for work [19][40]

- b. Demarcation of the vicinity zone with barrier, boarding, grids, protection barrier

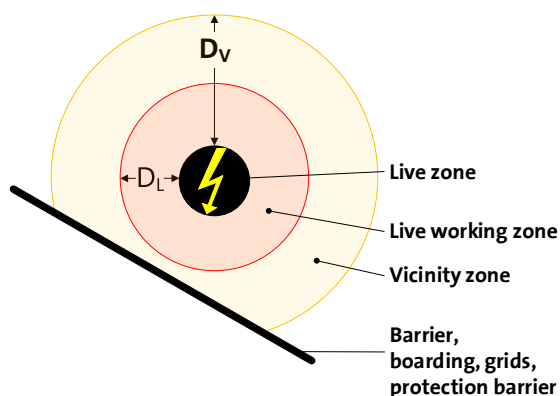


Chart A2.5.3.1.1b: Vicinity and live working zone, demarcation of the vicinity zone [19][40]

- c. Demarcation of the live working zone with a tested protective device suitable for the corresponding voltage

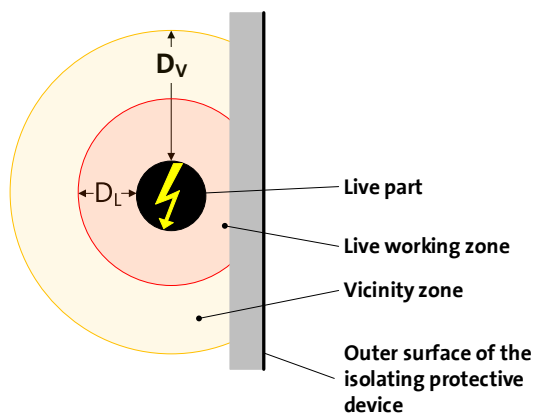


Chart A2.5.3.1.1c: Vicinity and live working zone, demarcation of the live working zone [19][40]

A2.5.3.1.2 Low and extra-low voltage

- a. Distance in air and zones for work

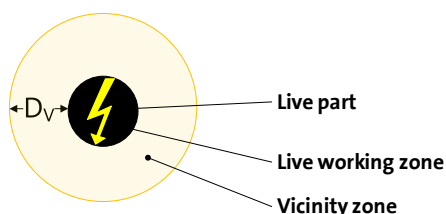


Chart A2.5.3.1.2a: Vicinity and live working zone, distance in air and zones for work [19][40]

- b. Demarcation of the live working zone with a tested protective device suitable for the corresponding voltage

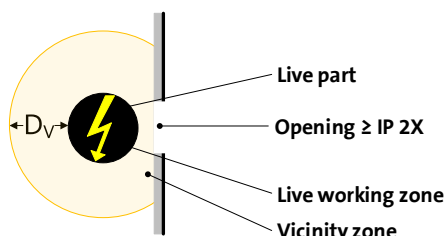


Chart A2.5.3.1.2b: Vicinity and live working zone, demarcation of the vicinity zone [19][40]

A2.5.3.1.3 Distances

Nominal system voltage U_N (effective value) (kV)	Acceptable minimum distance in air that determines the outer boundary of the live working zone D_L (mm)	Acceptable minimum distance in air that determines the outer boundary of the vicinity zone D_V (mm)
< 1	No contact	300
3	60	1120
6	90	1120
10	120	1150
15	160	1160
20	220	1220
30	320	1320

Table A2.5.3.1.3: Vicinity and live working zone, distances [19][40]

Switching order for high, low and extra-low voltage

SPECIMEN

Schedule for high, low and extra-low voltage

SPECIMEN

Current specification documents: www.swisscom.ch/electro

Schalttauftrag an elektrische Anlagen			
Angemittelter der Installation Name 1 Name 2 Strasse, Nr. PLZ, Ort Telefon Ort der Installation O-Nr. Anlage Stromkunde Strasse, Nr. PLZ, Ort		Auftragnehmer Name Strasse, Nr. PLZ, Ort Telefon Datum O-Nr. Gebührentart Zähler Nr. Lage Nutzung	
Schaltungen Datum von bis Zeit von bis Bemerkung Einzel		Datum von bis Zeit von bis bis	
Verantwortliches Personal			
Name, Vorname Telefon / Funk Unternehmen Funktion Qualifikation gemäss SIKo Elektro			
Arbeitsschutz / Regeln — Arbeitsregeln R13.1.2.1 gelesen und verstanden — Aktuelle Schaltpläne und Unterlagen vorhanden und konsistent — Kommunikation abgesichert — Person mit Ausbildung, Schuttberechnung gemäss StV vorhanden — Person mit Ausbildung Erste Hilfe per Arbeitsstelle vorhanden Personen, Vorschriften und Massnahmen:			
Änderungen — Schmelzbildung — Änderung Messung — Änderung Notabschaltungen —		Erforderliche Massnahmen — Notabschaltung erforderlich — Umschaltungen Netz A — Umschaltungen Netz B —	
Anforderung			
Nr.	Zeitraum	Nr.	Anzahl KW
Bemerkungen			

Form A2.5.3.2b: Switching order for telecommunications installations 48 V DC

A2.7 Training topics and responsibility

Function	Responsible ⁵⁹	2.7.7a Fundamentals and dangers of electricity	2.7.7b First aid for electrical and electrolyte accidents	2.7.7c Work safety	2.7.7d Order process	2.7.7e Authorisation, duties, competence and responsibility	2.7.7f Live working	2.7.7g Activity-specific continuing training in general	2.7.7h Activity-specific continuing training of instructed persons
B3.2.1 Proprietor and delegated proprietor	B3.2.2	5 Y	3 Y ⁶⁰	2 Y ⁶¹	5 Y	2 Y			
B3.2.2 Electrical safety officer	B3.2.1	GA	3 Y	2 Y	2 Y	2 Y	2 Y		
B3.2.3 Electro Agent	B3.2.1	GA	3 Y	2 Y	2 Y	2 Y	2 Y		
B3.2.4 Person responsible for an electrical installation and nominated person responsible for an electrical installation	B3.2.1	5 Y	3 Y ⁶⁰	2 Y ⁶¹	2 Y	2 Y	2 Y ⁶²		
B3.2.5 nominated person in control of an electrical installation during work activities	B3.2.3 ⁶³ B3.2.4	GA	3 Y	2 Y	2 Y	2 Y	2 Y	1 D/Y	
B3.2.6 Nominated person in control of a work activity	B3.2.3 ⁶³ B3.2.4	GA / 2 Y	3 Y ⁶⁰	2 Y ⁶¹		2 Y	2 Y ⁶²	1 D/Y	

⁵⁹ Responsibility: It only has to be checked whether the functions have carried out the trainings. The cost responsibility is not regulated in the electrical safety concept.

⁶⁰ Recommended, only if a relevant need exists

⁶¹ Only if a relevant need exists

⁶² Only necessary if there is no electro agent or regions manager with expertise in the organisational unit

⁶³ Only for Swisscom AG employees

Function	Responsible ⁵⁹	Fundamentals and dangers of electricity 2.7.7a	First aid for electrical and electrolyte accidents 2.7.7b	Work safety 2.7.7c	Order process 2.7.7d	Authorisation, duties, competence and responsibility 2.7.7e	Live working 2.7.7f	Activity-specific continuing training in general 2.7.7g	Activity-specific continuing training of instructed persons 2.7.7h
B3.2.7 Skilled persons (electrically)	B3.2.4	GA	3 Y	2 Y		2 Y		1 D/Y	
B3.2.8 Instructed persons (electrically)	B3.2.4	2 Y	3 Y ₆₄	2 Y ₆₅	2 Y ₆₆	2 Y		1 D/Y ₆₇	2 Y
B3.2.9 Ordinary persons (electrically)	B3.2.1	2 Y	3 Y ₆₄						
B3.2.10.1 Authorised person for general installation work, Art. 9 NIV	B3.2.4	GA	3 Y ₆₄			2 Y		1 D/Y	
B3.2.10.2 Authorised person for work on company-owned installations, Art. 13 NIV	B3.2.3 ⁶⁸ B3.2.4	GA / 2 Y	3 Y ₆₄			2 Y		1 D/Y	
B3.2.10.3 Authorised person for installation work on special installations, Art. 14 NIV	B3.2.3 ⁶⁸ B3.2.4	GA / 2 Y	3 Y ₆₄			2 Y		1 D/Y	

⁶⁴ Recommended, only if a relevant need exists

⁶⁵ Only if a relevant need exists

⁶⁶ Only Swisscom AG and FM provider employees

⁶⁷ Only for instructed persons for activities on telecommunications installations (R4.1.6a and R4.1.6b)

⁶⁸ Only for Swisscom AG employees

Function	Responsible ⁶⁹	Fundamentals and dangers of electricity 2.7.7a	First aid for electrical and electrolyte accidents 2.7.7b	Work safety 2.7.7c	Order process 2.7.7d	Authorisation, duties, competence and responsibility 2.7.7e	Live working 2.7.7f	Activity-specific continuing training in general 2.7.7g	Activity-specific continuing training of instructed persons 2.7.7h
B3.2.10.4 Authorised person with connection permit, Art. 15 NIV	B3.2.3 ⁶⁹ B3.2.4	GA / 2 Y	3 Y ₇₀			2 Y		1 D/Y	
B3.2.10.5 Authorised person for work on products NEV	B3.2.4		3 Y ₇₀			2 Y			
B3.2.10.6 Authorised person for work on heavy current installations StV	B3.2.4	GA / 2 Y	3 Y ₇₀	2 Y ₇₁		2 J		1 D/Y	
B3.2.10.7 Authorised person for inspections and tests	B3.2.4	GA	3 Y ₇₀			2 Y		1 D/Y	

Table A2.7: Training topics and responsibility

⁶⁹ Only for Swisscom AG employees

⁷⁰ Recommended, only if a relevant need exists

⁷¹ Only if a relevant need exists

A2.8.6 Electrical fires, extinguishing agents and safety distances [47]







	Fuel	Appearance	Examples	Extinguishing agent / effect							
				Water jet	Water spray	Foam / CAFS / wetting	AB powder ⁷²	BC powder ⁷²	D powder ⁷²	F extinguishing agent	Carbon dioxide (CO ₂)
	Solid, non-melting substances	Glowing and Flames	Wood, paper, textiles, coal, non-melting plastics	☺	☺	☺	☹	☹	☹	☺	☹
	Liquids, melting solids	Flames	Solvents, oils, waxes, melting plastics	☹	☺	☺	☹	☺	☹	☺	☺
	Gases	Flames	Propane, butane, acetylene, natural gas, methane, hydrogen	☹	☹	☹	☺	☺	☹	☹	☺
	Metals	Glowing	Sodium, magnesium, aluminium	☹	☹	☹	☹	☹	☺	☹	☹
	Edible oils / fats	Flames, in connection with water: Grease explosion	Edible oils / fats in frying and fat cooking appliances and other kitchen appliances	☹	☹	☹	☹	☹	☹	☺	☹
	Fires in electrical installations	Flames, sparks	Switchgear combinations, UPS, power supply and compensation installations, electrical devices, photovoltaics	☺	☺	☺	☺	☺	☹	☹	☺
				Safety distance in metres							
				≤ 1000V	5	1	⁷³ 1	⁷³ 1	1	1	1
			> 1000V	10	5		5	5			5

Table A2.8.6: Electrical fires, extinguishing agents and safety distances

Observe the operating instructions and warnings on the extinguishing equipment.

⁷² (SC) May not be used at Swisscom AG

⁷³ Only in dead installations

Example:

Exercise caution with live installations. Usable up to 1000 V.
Minimum distance 1 m. Avoid electrical contact.
Prudence avec les installations sous tension. Utilisable jusqu'à
1000 V. Distance minimale 1m. Eviter tout contact électrique.
Prudenza con installazioni sotto tensione. Utilizzabile fino a 1000V.
Distanza minima 1m. Evitare tutti i contatti elettrici.

Figure A2.8.6.1: Example of instructions and warning on an extinguisher

Fires in the area of electrical installations should be fought with a water spray, if possible (not a jet spray).



Figure A2.8.6.2: Example of CO₂ extinguisher

The manufacturer's information must also be observed for energy storage and energy generation plant.

A3.2 Responsibility and authorisation matrix

The tables below indicate the responsibility that applies to the functions according to organisation 2.1.1.X as well as the relevant authorisations based on personal competences or ordinance.

In principle, this means a differentiation between responsibility and authorisation.

The responsibility matrix utilises the RACI model. It shows which functions according to organisation 2.1.1.X have overall responsibility or implementation responsibility, who has a right to be informed or must always be consulted.

Due to the selected model with delegated responsibilities, it can be that multiple functions have overall or implementation responsibility for the same rule. In the case of delegated roles, the assignment of overall and implementation responsibility only ever applies to the corresponding sub-area and level.

The following abbreviations are used:

R	Responsible	Implementation responsibility, responsible for the actual performance. The person who initiates the implementation (including by others). This person may also perform the activity himself.
A	Accountable	Overall responsibility, responsible in the sense of “approving” or “signing off”. The person who bears responsibility in the legal or technical sense.
C	Consulted	To be consulted. A person who may not participate directly in the implementation but has relevant information for the implementation and should therefore be consulted.
I	Informed	To be informed (right to information). A person who receives information about the progress and/or result of the activity or has the right to receive information.

With regard to authorisations, there is a difference between entitled and qualified. The following abbreviations are used here:

E	Entitled	Entitled. A person or group of persons directly participating in the implementation and authorised to carry out the activities.
Q	Qualified	Qualified. A person directly participating in the implementation and qualified and authorised to carry out the activities.

Because not every permit as per NIV yields clear competences for the employees, it is necessary to differentiate between entitled and qualified.

NOTE: Activities may only be carried out if a person or group of persons is both entitled and qualified to perform the activities.

The following ratings apply to all tables in A3.2:

- ¹ Only required if the activity has an impact on operation of the installation
- ² Only activities listed in the permit are allowed
Only if skilled person; otherwise, instruction in R2.3.X Access or training SC / FM provider with verification required
- ³ verification required
- ⁴ Instruction in R2.3.X Access or training SC / FM provider with verification required
- ⁵ Only if skilled person for high voltage; otherwise on-site instruction required
- ⁶ Only instruction in R2.3.X Access and R2.5.3 Work
- ⁷ Only with activity-specific electrical training
- ⁸ Only in installations in which the colocation partner is itself proprietor
- ⁹ In an emergency with an appropriate electrical instruction

For example, from the perspective of the nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations in the organisational unit

They have the function of nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for the organisational unit, are employed at Swisscom AG and have no electrotechnical base education but have been instructed.

The responsibility can be found in Table A3.2.1 in row B3.2.4e. The authorisation can be found in Table A3.2.2 in row B3.2.8a.

If individual responsibilities are further delegated, such as to the nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for the object group, the nominating person still retains overall responsibility. This means that the delegating person is responsible for ensuring that the further delegated tasks are completed as per the safety concept. This fact must be observed for all delegations.

Example from the perspective of the electrical installation proprietor:

You receive an order for an electrical installation as per NIV and assign a skilled person to do the work.

The responsibility matrix in Table A3.2.1 shows the responsibilities for the nominated person in control of an electrical installation during work activities in row B3.2.5d and for nominated person in control of a work activity in row B3.2.6, the authorisation is shown in Table A3.2.2, row B3.2.7a, and Table A3.2.3, row B3.2.10.1.

Example from the perspective of the switchgear combination proprietor:

You receive an order for inspecting the circuit breakers in an existing switchgear combination and assign a skilled person for low and extra-low voltage to do this.

The responsibility matrix in Table A3.2.1 shows the responsibilities for the nominated person in control of an electrical installation during work activities in row B3.2.5d and the nominated person in control of a work activity in row B3.2.6; the authorisation is shown in Table A3.2.2, row B3.2.7b, and Table A3.2.3, row B3.2.10.5.

A3.2.1 Responsibility matrix

Category of persons			Activity				Access				Procurement			Work					Switching					Instruction and first aid				Network operator				Activities						
							R2.3.1	R2.3.2	R2.3.3	R2.3.4	R2.5.1.1	R2.5.1.2	R2.5.1.3	R2.5.3	R2.5.3.1a	R2.5.3.1b	R2.5.3.1c1	R2.5.3.1c2	R2.5.3.2.1a	R2.5.3.2.1b	R2.5.3.2.1c	R2.5.3.2.1d	R2.5.3.2.1e	R2.5.3.2.2	R2.7.6	R2.8	R2.8.4	R2.8.5	R4.1a	R4.1b	R4.1c	R4.1d	R4.1.1	R4.1.2	R4.1.3	R4.1.6a	R4.1.6b	R4.1.7
Responsible party	B3.2.1a	Proprietor	A	A	A	A	A	A	A	I	I	I	I	I	I	I	I	I		A	A	R	R	I	I	I	I	A	A	A	A	A						
	B3.2.1b	Delegated proprietor in the organisational unit	A	A	A	A	A	A	A	I	I	I	I	I	I	I	I	I		A	A	R	R	I	I	I	I	A	A	A	A	A						
	B3.2.1c	Delegated proprietor for the object / object group	R	R	R	R	R	R	I	C	C	C	C	C	C	C	C	C		R	R	R	R	I	I	I	I	R	R	R	R	R						
	B3.2.2a	Electrical safety officer, Swisscom AG	I	I	I	I	I	I	I	I	I	I	I								A	R	R															
	B3.2.2b	Electrical safety officer, Swisscom Broadcast AG	I	I	I	I	I	I	I	I	I	I	I								A	R	R															
	B3.2.2c	Electrical safety officer, FM provider		I	I	I	I			I	I	I	I	I							A	R	R															
	B3.2.3	Electro Agent		I	I	I	I	C	C	C	C	C	C								I	R	R															
	B3.2.4a	Person responsible for an electrical installation of a high voltage distribution network	A				A	A	A	I	I	I	I		C						A	A	R	R					A									
	B3.2.4b	Person responsible for an electrical installation of a high voltage site network	A				A	A	A	I	I	I	I		C						A	A	R	R					A									
	B3.2.4c	Person responsible for an electrical installation of low and extra-low voltage infrastructure installations		A	I	I	A	A	A	I	I	I	I	I	I	I	I	I	I		A	A	R	R	I	I	I	I	I	A								
	B3.2.4d	Person responsible for an electrical installation of low and extra-low voltage telecommunications installations		I	A	A	A	A	A	I	I	I	I	I	I	I	I	I			A	A	R	R	I	I	I	I			A	A	A					
	B3.2.4e	Nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations in the organisational unit		A	I	I	A	A	A	I	I	I	I	A	I	I	I	I	I		A	A	R	R	A	A	A	A	I	A								
	B3.2.4f	Nominated person responsible for an electrical installation of low and extra-low voltage telecommunications installations in the organisational unit		I	A	A	A	A	I	I	I	I	I	A	I	I	I	I	I		A	A	R	R	A	A	A	A	I	I	A	A	A					
	B3.2.4g	Nominated person responsible for an electrical installation of a high voltage site network for the object / object group	R				R	R	A	C	C	C	C		C						A	R	R	R					R									
	B3.2.4h	Nominated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for the object / object group		R	I	I	R	R	I	C	C	C	C	C	I	C	C	C	C		R	R	R	R	R	R	R	R	C ¹	R	C	C	C					
	B3.2.4i	Nominated person responsible for an electrical installation of low and extra-low voltage telecommunications installations for an object / object group		I	R	R	R	I	I	C	C	C	C	C	I	C	C	C	C		R	R	R	R	R	R	R	R	C ¹	C ¹	R	R	R					
	B3.2.5a	Nominated person in control of an electrical installation during work activities of a high voltage distribution network								A	A	A	A	A	A							R	R	R														
	B3.2.5b	Nominated person in control of an electrical installation during work activities of a high voltage site network								A	A	A	A	A	A							R	R	R														

Category of persons		Activity	Access				Procurement		Work				Switching					Instruction and first aid				Network operator				Activities							
			R2.3.1	R2.3.2	R2.3.3	R2.3.4	R2.5.1.1	R2.5.1.2	R2.5.1.3	R2.5.3	R2.5.3.1a	R2.5.3.1b	R2.5.3.1c1	R2.5.3.1c2	R2.5.3.2.1a	R2.5.3.2.1b	R2.5.3.2.1c	R2.5.3.2.1d	R2.5.3.2.1e	R2.5.3.2.2	R2.7.6	R2.8	R2.8.4	R2.8.5	R4.1a	R4.1b	R4.1c	R4.1d	R4.1.1	R4.1.2	R4.1.3	R4.1.6a	R4.1.6b
B3.2.5c	Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations at the FM provider		R				R	R		A	A	A	A	A	A	A	A	A		R	R	R	R	R	R	R	R		R	I	I	I	
B3.2.5d	Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations									A	A	A	A	A		A	A	A	A			R	R	R									
B3.2.5e	Nominated person in control of an electrical installation during work activities of low and extra-low voltage telecommunications installations									A	A	A	A	A		A	A	A	A			R	R	R									
B3.2.6	Nominated person in control of a work activity									R	R	R	R	R	R	R	R	R			R	R	R										

Table A3.2.1: Responsibility matrix

A3.2.2 Authorisation matrix by competences

Category of persons			Activity	Access				Procurement			Work					Switching					Instruction and first aid				Network operator				Activities						
				R2.3.1	R2.3.2	R2.3.3	R2.3.4	R2.5.1.1	R2.5.1.2	R2.5.1.3	R2.5.3	R2.5.3.1a	R2.5.3.1b	R2.5.3.1c1	R2.5.3.1c2	R2.5.3.2.1a	R2.5.3.2.1b	R2.5.3.2.1c	R2.5.3.2.1d	R2.5.3.2.1e	R2.5.3.2.2	R2.7.6	R2.8	R2.8.4	R2.8.5	R4.1a	R4.1b	R4.1c	R4.1d	R4.1.1	R4.1.2	R4.1.3	R4.1.6a	R4.1.6b	R4.1.7
Authorised party by competences	B3.2.7a	Skilled person (electrically)		Q	Q	Q				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q ⁶	Q	Q	Q	Q	Q				Q						Q
	B3.2.7b	Skilled person for low and extra-low voltage		Q	Q	Q				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q ⁶	Q	Q	Q	Q	Q				Q						Q
	B3.2.7c	Skilled person for high voltage	Q	Q	Q	Q				Q	Q	Q	Q		Q				Q	Q ⁶	Q	Q	Q	Q	Q				Q						Q
	B3.2.7d	Skilled person for electrical safety		Q	Q	Q				Q	Q	Q	Q	Q		Q	Q	Q	Q	Q ⁶	Q	Q	Q	Q	Q	Q	Q								Q
	B3.2.7e	Skilled person for electrical safety of high-availability installations	Q ⁵	Q	Q	Q		Q		Q	Q	Q	Q	Q		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q								Q
	B3.2.7f	Authorised skilled person	Q ⁵	Q	Q	Q		Q		Q	Q	Q	Q	Q		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q				Q						Q
	B3.2.8a	Instructed persons Swisscom AG proprietor and person responsible for an electrical installation		Q ⁴	Q ⁴	Q ⁴	Q	Q											Q				Q	Q	Q				Q						Q
	B3.2.8b	Instructed persons Swisscom AG Project manager / service manager		Q ⁴	Q ⁴	Q ⁴		Q	Q				Q						Q				Q	Q	Q				Q						Q
	B3.2.8c	Instructed persons Swisscom AG		Q ⁴	Q ⁴	Q ⁴	Q			Q	Q								Q				Q	Q	Q				Q						Q
	B3.2.8d	Instructed persons FM provider with switching authorisation		Q ⁴	Q ⁴	Q ⁴	Q			Q			Q			Q	Q	Q	Q	Q ⁶			Q	Q	Q				Q						Q
	B3.2.8e	Instructed persons FM provider		Q ⁴	Q ⁴	Q ⁴	Q			Q									Q	Q ⁶			Q	Q	Q				Q						Q
	B3.2.8f	Instructed persons Security service, reception, cleaning		Q ⁴	Q ⁴	Q ⁴	Q												Q				Q	Q											Q
	B3.2.8g	Instructed persons Colocation partner								Q ⁸	Q ⁸	Q ⁸	Q ⁸				Q ⁸		Q ⁸				Q	Q							Q ⁸	Q ⁸	Q ⁸	Q	
	B3.2.8h	Instructed (electrical) fire brigade	Q ⁹	Q ⁹	Q ⁹	Q ⁹									Q ⁹	Q ⁹	Q ⁹	Q ⁹	Q ⁹	Q				Q	Q									Q	
	B3.2.8i	Instructed persons, external	Q ⁵	Q ⁴	Q ⁴	Q ⁴				Q									Q				Q	Q											Q
	B3.2.9	Ordinary persons (electrically)																					Q	Q	Q	Q									Q

Table A3.2.2: Authorisation matrix by competences

A3.2.3 Authorisation matrix by ordinance

Category of persons			Activity	Access				Procurement			Work				Switching						Instruction and first aid				Network operator				Activities								
				R2.3.1	R2.3.2	R2.3.3	R2.3.4	R2.5.1.1	R2.5.1.2	R2.5.1.3	R2.5.3	R2.5.3.1a	R2.5.3.1b	R2.5.3.1c1	R2.5.3.1c2	R2.5.3.2.1a	R2.5.3.2.1b	R2.5.3.2.1c	R2.5.3.2.1d	R2.5.3.2.1e	R2.5.3.2.2	R2.7.6	R2.8	R2.8.4	R2.8.5	R4.1a	R4.1b	R4.1c	R4.1d	R4.1.1	R4.1.2	R4.1.3	R4.1.6a	R4.1.6b	R4.1.7		
Authorised party by ordinance	B3.2.10.1	Authorised person for general installation work, Art. 9 NIV		E ³	E ³	E ³				E	E	E	E	E			Q	Q		Q				Q	Q							Q	Q	Q	Q ⁷	Q	
	B3.2.10.2	Authorised person for work on company-owned installations, Art. 13 NIV		Q ³	Q ³	Q ³				Q	Q	Q	Q			Q	Q	Q	Q	Q				Q	Q							Q	Q			Q	
	B3.2.10.3a	Authorised person for installation work on special installations, Art. 14 NIV, Swisscom		Q ³	Q ³	Q ³				Q	Q	Q	Q				Q	Q	Q	Q				Q	Q							Q ²	Q ²	Q ²	Q ⁷	Q	
	B3.2.10.3b	Authorised person for installation work on special installations, Art. 14 NIV, FM provider		Q ³	Q ³	Q ³				Q	Q	Q	Q				Q	Q		Q				Q	Q							Q ²	Q ²	Q ²	Q ⁷	Q	
	B3.2.10.3c	Authorised person for installation work on special installations, Art. 14 NIV, external		Q ³	Q ³	Q ³				Q	Q	Q	Q	Q				Q	Q		Q				Q	Q						Q ²	Q ²	Q ²	Q ⁷	Q	
	B3.2.10.4a	Authorised person with connection permit, Art. 15 NIV, Swisscom		Q ³	Q ³	Q ³				Q	Q	Q	Q					Q	Q	Q	Q				Q	Q							Q ²	Q ²	Q ²	Q ⁷	Q
	B3.2.10.4b	Authorised person with connection permit, Art. 15 NIV, FM provider		Q ³	Q ³	Q ³				Q	Q	Q	Q					Q	Q		Q				Q	Q							Q ²	Q ²	Q ²	Q ⁷	Q
	B3.2.10.4c	Authorised person with connection permit, Art. 15 NIV, external		Q ³	Q ³	Q ³				Q	Q	Q	Q	Q					Q	Q		Q				Q	Q						Q ²	Q ²	Q ²	Q ⁷	Q
	B3.2.10.5	Authorised person for work on products, NEV		E ³	E ³	E ³				E	E	E	E	E		E	E	E	E	E	Q				Q	Q								Q	Q ⁷	Q ⁷	Q
	B3.2.10.6	Authorised person for work on installations as per the Heavy Current Ordinance, StV	E ⁵	E ³	E ³	E ³				E	E	E	E		E ⁵		E	E		Q	Q ⁶				Q	Q					Q ⁷				Q ⁷	Q	
B3.2.10.7a	Authorised person for inspection of low and extra-low voltage, (NIV)	Q ⁵	Q	Q	Q				Q	Q	Q	Q				Q	Q	Q	Q	Q	Q ⁶			Q	Q								Q	Q	Q ⁷	Q	
B3.2.10.7b	Authorised person for inspection of high-availability installations of low and extra-low voltage (NIV)	Q ⁵	Q	Q	Q				Q	Q	Q	Q				Q	Q	Q	Q	Q	Q			Q	Q								Q	Q	Q ⁷	Q	
B3.2.10.7c	Authorised person for inspection of heavy current installations (StV)	E ⁵	E ³	E ³	E ³				E	E	E	E					Q	Q		Q				Q	Q								Q	Q	Q ⁷	Q	
B3.2.10.7d	Authorised person for testing of electrical devices (NEV)		E ³	E ³	E ³				E	E		E								Q				Q	Q											Q	

Table A3.2.3: Authorisation matrix by ordinance

A3.2.7.1 Activities on electrical installations⁷⁴

Activities			Competence / permit						Documentation / measurements
			Art. 9 NIV	Art. 13 NIV	Art. 14 NIV	Art. 15 NIV	Trained	Ordinary persons	
Rules as per SE-DSR-02400									
	Description	Examples							
Working procedures s									
R2.5.3.1a	Dead working		✓	✓	✓	✓	✓	✓	
R2.5.3.1b	Work in the vicinity of live parts		✓	✓	✓	✓	✓	✗	
R2.5.3.1c1	Live working1	Cleaning, measurement	✓	✓	✓	✓	✓	✗	
R2.5.3.1c2	Live working2		✓	✗	✗	✗	✗	✗	
R4.1.2 Low and extra-low voltage installation									
R2.5.3.1c1	Maintenance	Measurement, troubleshooting	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	New installation	Completely new installation incl. switchgear combination	✓	✗	✗	✗	✗	✗	Safety record incl. measurement and testing report 1) to 6)
R2.5.3.1a R2.5.3.1b R2.5.3.1c1	Change to existing installation I	Replacement, repair or removal of existing installations	✓	✓	✗	✗	✗	✗	For replacement: Safety record incl. measurement and testing report or list 1) to 6)
R2.5.3.1a R2.5.3.1b	Change to existing installation II	Cable pulling (fibre-optic, network) through existing installation	✓	✓	✗	~	✗	✗	MP 1) and 4) of affected sockets
R2.5.3.1a	Extension of an existing installation	Installation of additional sockets or other consumers	✓	✓	✗	✗	✗	✗	Safety record incl. measurement and testing report or list 1) to 6)

⁷⁴ This overview is the content of the permit as per Art. 13-15 NIV of the Swisscom AG employees; changes only in consultation between electrical safety officer, ESTI and Electrosuisse. This overview cannot be generally applied for activities on electrical installations.

Activities			Competence / permit						Documentation / measurements
			Art. 9 NIV	Art. 13 NIV	Art. 14 NIV	Art. 15 NIV	Trained	Ordinary persons	
Rules as per SE-DSR-02400									
	Description	Examples							
R4.1.6a	Work on telecommunications installations < 60 V DC⁷⁵								
R2.5.3.1a R2.5.3.1c1	Maintenance	Measurement, troubleshooting	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	New installation	Completely new installation incl. switchgear combination	✓	✗	✗	✗	✗	✗	Safety record incl. measurement and testing report 1), 2), 5)
R2.5.3.1a R2.5.3.1b	Change to existing installation I NIV	Replacement, repair or removal of existing installations	✓	✓	~	✗	✗	✗	For replacement: Safety record incl. measurement and testing report or list 1), 2), 5)
R2.5.3.1a R2.5.3.1b	Change to existing installation I NEV	Replacement, repair or removal of existing installations	✓	✓	✓	✓	✓	✗	For replacement: Measurement and testing report or Statement 1), 2), 5)
R2.5.3.1a R2.5.3.1b	Change to existing installation II	Switch or remove transitions	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	Extension of an existing installation NIV	Installation of additional consumers	✓	✓	~	✗	✗	✗	Safety record incl. measurement and testing report or Statement 1), 2), 5)
R2.5.3.1a	Extension of an existing installation NEV	Installation of additional consumers	✓	✓	✓	✓	✓	✗	Measurement and testing report or Statement 1), 2), 5)

⁷⁵ Activity-specific instruction required

Activities			Competence / permit						Documentation / measurements
			Art. 9 NIV	Art. 13 NIV	Art. 14 NIV	Art. 15 NIV	Trained	Ordinary persons	
Rules as per SE-DSR-02400									
	Description	Examples							
R4.1.6b	Work on telecommunications installations > 60 V DC ^{76,77}								
R2.5.3.1a R2.5.3.1c1	Maintenance	Measurement, troubleshooting and fault correction	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	New installation	Entirely new installation	✓	✓	✓	✓	✓	✗	MP 2) In shaft: 7)
R2.5.3.1a R2.5.3.1b	Change to existing installation I	Replacement, repair or removal of existing installations	✓	✓	✓	✓	✓	✗	For replacement: MP 2) In shaft: 7)
R2.5.3.1a R2.5.3.1b	Change to existing installation II	Switch or remove transitions	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	Extension of an existing installation	Installation of additional consumers	✓	✓	✓	✓	✓	✗	MP 2) In shaft: 7)
Work on low and extra-low voltage switchgear combinations									
R2.5.3.1a R2.5.3.1b	Changes	Replacement or removal of existing equipment	✓	✓	✓	✓	✓	✗	Unit verification protocol for simple repairs and extensions 1), 2), 4), 5), 6)
R2.5.3.1a R2.5.3.1b	Extension	Installation of new equipment	✓	✓	✓	✓	✓	✗	
R2.5.3.1a R2.5.3.1b	Connection	Connection of additional final circuit	✓	✓	✓	✓	✓	✗	See extension of an existing installation
R4.1.3	Work on battery installations ⁷⁶								
R2.5.3.1c1 R2.5.3.1c2	New installation	Entirely new installation	✓	✓	~	~	✗	✗	Safety record incl. measurement and testing report or Statement 2)
R2.5.3.1c1 R2.5.3.1c2	Change	Replacement, repair (incl. measurement) or removal of existing battery installations	✓	✓	✓	✓	✓	✗	For replacement: MP 2)

⁷⁶ Activity-specific instruction required

⁷⁷ Examples: Remote power feeding ± 190 V DC

Activities			Competence / permit						Documentation / measurements
			Art. 9 NIV	Art. 13 NIV	Art. 14 NIV	Art. 15 NIV	Trained	Ordinary persons	
Rules as per SE-DSR-02400									
	Description	Examples							
Work on products⁷⁸									
R2.5.3.1c1	Change 1	Replacement of rectifier in UPS installations	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	Change 2	Replacement of power supply unit	✓	✓	✓	✓	✓	✗	
R2.5.3.1a	Connection 1	Connect apparatus cable to product	✓	✓	✓	✓	✓	✗	MPP 1), 2), 5), 6)
R2.5.3.1a	Connection 2	Direct connection to product (incl. connection to series feed distributor)	✓	✓	✓	✓	✓	✗	MP 1), 2), 5), 6)
R2.5.3.2.1 Switching									
R2.5.3.2.1b	Distribution circuits ⁷⁹	Switching of circuit breakers, low voltage, high breaking capacity fuses	✓	✓	✓	✓	✓	✗	
R2.5.3.2.1c	Final circuits	Switching of installations by ordinary persons ⁸⁰	✓	✓	✓	✓	✓	✓	
Use									
R2.5.3.2.2	Resetting low and extra-low voltage	Use of installations by ordinary persons ⁸⁰	✓	✓	✓	✓	✓	✓	
R4.1.7	Plugging in	Plugging in prefabricated cable and power strips at existing sockets	✓	✓	✓	✓	✓	✓	

Table A3.2.7.1a: Activities on electrical installations FS

⁷⁸ Activity-specific instruction required

⁷⁹ Instruction and authorisation required


⁸⁰ Installations by ordinary persons are circuit breakers, screw-in fuses, residual current devices.

Abbreviations			
✓	Activity permitted, observe rules	1)	Continuity of the conductors, especially the conductivity of the protective conductor and the equipotential bonding
✗	Activity not permitted	2)	Insulation resistance
~	Activity permitted, if explicitly listed in the authorisation	3)	Fault loop impedance (short-circuit current measurement)
SiNa	Safety record	4)	Tripping time of residual current device
SNP	Unit verification protocol	5)	Polarity
MP	Measurement report	6)	Direction of rotation
MPP	Measurement and testing report	7)	Earth electrode resistance

Table A3.2.7.1b: Key for activities on electrical installations FS

A3.2.7.2 Specimen statement of work carried out as per Art. 13 NIV to Art. 15 NIV

Verzeichnis der ausgeführten Arbeiten / Mess - und Prüfprotokoll der Erstprüfung
Fernmeldeanlagen



Eigentümer der Installation Name 1 Name 2 Strasse, Nr. PLZ, Ort Telefon		Auftragnehmer Firma Vor-/Nachnam Strasse, Nr. PLZ, Ort Telefon		Unabhängiges Kontrollorgan K-Nr. Firma Strasse, Nr. PLZ, Ort Kontrollart Datum	
Ort der Installation O-Nr. Strasse, Nr. PLZ, Ort Koordinaten Gebäudeart Kontroll-Per. AuftragsNr.		Kontrollumfang / Ausgeführte Installation Bemerkung		Verwendete Messtechnik nach IEC 61010 Prüfung durchgeführt nach	

Anschluss der Installation		Anlagenteil / Equipment		Leitung / Kabel		Schutz-einrichtung		Messungen und Prüfungen								Erstprüfung						
Raum	Distribution Board	Strom-kreis Nr.	Bezeichnung	Raum Rack	P (kW)	Art	Leiter	Länge (m)	Art	I _n (A)	U (V)	R _{iso} 4/PE (MΩ)	R _{iso} -PE (MΩ)	U anfang (V)	U ende (V)	ΔU (V)	Pol-anzahl [ok]	R _{LoH} (Ω)	I _{scad} @54V (A)	Sicht-prüfung	Datum	

Unterschrift Auftragnehmer Datum Techniker		Unterschrift akkreditierte Inspektionsstelle Datum Kontrollberechtigter	
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Verzeichnis
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Table A3.2.7.3: Statement Art. 13 NIV to Art. 15 NIV

Current specification documents: www.swisscom.ch/electro

A3.2.8 Confirmation of receiving instruction

Employees of third party companies may not carry out any work without a clear order. When issuing the order, the customer is responsible for providing information about the operation's work safety requirements.

General requirements

Employees of third party companies must be informed diligently of the following before starting work:

- The responsible contact person;
- The work to be carried out;
- The work location;
- Any particular hazards;
- Safety regulations and working conditions;
- Ensuring first aid.

Requirements for electrical work

General

Employees of third party companies who carry out electrical work must meet the following conditions:

- Has the necessary competences, as per section 3.1.1, and permits (e.g. general or restricted installation permit, etc.);
- Always carries out self-checks (e.g. as per NIN, EN 60204, EN 61439, etc.) and must pass on inspection findings and any safety records, etc. without further request to the person responsible for an electrical installation⁸¹ before handover of the installation;
- Has completed training in conventional first aid and use of the AED within the last three years (at least 1 person per work location) [14].

Language

If an employee of a third party company takes on the role of nominated person in control of an electrical installation during work activities or nominated person in control of a work activity, he must be able to communicate in the official regional language to at least level B2 of the Common European Framework of Reference for Languages (CEFR).

Competence of the nominated person in control of an electrical installation during work activities

If an employee of a third party company takes on the role of nominated person in control of an electrical installation during work activities (B3.2.5) [19][46], he must also have the following:

- Qualification as skilled person;
- Knowledge of the operating condition of the electrical installation;
- Ability to evaluate the impact of planned work on the safe operation of the installation;
- Ability to identify the particular dangers present during work on or in the vicinity of electrical installation.

He must also ensure that when work is carried out on or in the vicinity of this installation the particular dangers associated with the system are taken into account and the safe operation of the system is maintained. He is responsible for implementing the safety principles and regulations of the Electrical Safety Concept locally.

⁸¹ For low and extra-low voltage installations in data centres, to the nominated person in control of an electrical installation during work activities of the FM provider as per section 2.1.1.1.

Competence of the nominated person in control of a work activity

If an employee of a third party company takes on the role of nominated person in control of a work activity (B3.2.6) [19][46], he must also have the following:

- Knowledge of the work assigned and experience in carrying out such work;
- Knowledge of the applicable provisions and standards for carrying out the work assigned;
- Ability to assess the work assigned;
- Ability to identify the dangers associated with the work assigned.

General duties

Fulfilment of the specific duties set out in the order.

Duties of nominated person in control of an electrical installation during work activities

If an employee of a third party company takes on the role of nominated person in control of an electrical installation during work activities (B3.2.5) [19][46], he also has the following duties:

- The nominated person in control of an electrical installation during work activities for an electrical installation must ensure that when work is carried out on or in the vicinity of electrical installations the particular dangers associated with the electrical installation are taken into account and the safe operation of the electrical installation is maintained [19][46].
- He is responsible for ensuring that the person responsible for an electrical installation is informed before work is carried out [19].
- He is responsible for granting authorisation for work on or in the vicinity of electrical installations. He is responsible for implementing the safety principles and regulations of the Electrical Safety Concept locally.
- He is responsible for issuing instructions to the nominated person in control of a work activity, and specifying and supervising work procedures. When performing these duties he must consistently adhere to the safety principles and regulations set out in the safety concept.

Duties of a nominated person in control of a work activity

If an employee of a third party company takes on the role of nominated person in control of a work activity (B3.2.6) [19][46], he also has the following duties:

- Before and during work the nominated person in control of a work activity must ensure that all safety requirements applicable to their work, safety rules and company instructions are observed while the work is being carried out.
- The nominated person in control of a work activity must instruct all persons involved in the work of all reasonably foreseeable dangers of which they would not automatically be aware. He is also responsible for ensuring that persons carrying out work receive relevant instruction beforehand and on completion.
- Issues the permission to start work:
 - in writing, for high voltage installations and complex low and extra-low voltage installations;
 - verbally for all other installations.
- He is responsible for implementing the safety principles and regulations of the Electrical Safety Concept locally.

Authorisations

Third parties are normally granted authorisation for work in the vicinity of electrical installations that has been adapted individually for a specific order and are supervised by a person employed by the FM provider or Swisscom AG, who is responsible for monitoring the outside personnel and providing instruction as appropriate for the situation. The safety principles and regulations related to the work must be observed strictly.

Regulations for which instruction has been provided:

- ☐ Safety regulation and code of conduct for suppliers
- ☐ R2.3 Access
- ☐ R2.5.3 Work
- ☐ R2.5.3.2.1 Switching
- ☐ R2.5.3.2.2 Resetting low and extra-low voltage
- ☐ R2.5.3.1a Dead working
- ☐ R2.5.3.1b Working in the vicinity of live parts
- ☐ R2.5.3.1c1 Live working1
- ☐ R2.5.3.1c2 Live working2
- ☐ R2.8 Emergency arrangements
- ☐ R2.8.4 First aid for electrical accidents
- ☐ R2.8.5 First aid for electrolyte accidents
- ☐ R4.1.1 High voltage installation
- ☐ R4.1.2 Low and extra-low voltage installation
- ☐ R4.1.3 Work on battery installations
- ☐ R4.1.6a Work on telecommunications installations < 60 V DC
- ☐ R4.1.6b Work on telecommunications installations > 60 V DC
- ☐ R4.1.7 Use and operation of electrical installations and equipment by ordinary persons
- ☐ _____
- ☐ _____

I, the undersigned, confirm that I have received instruction as defined by this authorisation sheet and the regulations list and have understood the instruction:

Company name: First name / last name:
 Address: Town/city, postcode:
 Date: Signature:
 Contact person: Mobile number:

The instruction was given by:

Company name: First name / last name:
 Address: Town/city, postcode:
 Date: Signature:

In order to keep administrative work to a minimum, we ask persons who have received instruction to create a pdf copy or take a photo using their smartphone. Evidence of receiving the instruction must be provided on request and is valid for a maximum of 2 years.

A3.3.2 PPE-E protective clothing levels

The thermal effects of an electric arc depend on the effective electrical energy (short-circuit capacity of the installation), which determines the thermal energy converted in the arc (depending on the arc voltage, the arc current and the arc duration). Furthermore, the specific transmission and exposition relationships including the system configuration and the effective distance to the arc (transfer ratios) are key to the effects. The hazards posed by an electric arc are entirely independent of the nominal voltage (low voltage or high voltage).

As well as the thermal effects, other hazards must be taken into account:

- Shock waves and entrained fragments that are released due to the explosive spread of the electrical arc;
- High intensity electromagnetic radiation, in particular in the ultraviolet (UV) and infrared (IR) radiation range, but also in the visible light range, which can lead to irreparable damage to the skin and eyes;
- High acoustic load (bang);
- Toxic gases and particles produced due to melting and boiling of materials in the vicinity of the electrical arc (including the electrodes).

Suitable personal protective equipment for protection against electrical hazards reduces the thermal effects of an electrical arc and helps protect personnel. It is important to note that no personal protective equipment for protection against electrical hazards can guarantee complete protection against any potential electrical arcs. However the use of personal protective equipment for protection against electrical hazards can significantly reduce the effects of an electrical arc and often even eliminate them completely.

Personal protective equipment for protection against electrical hazards is categorised according to the following levels:

Level	Equivalent arc energy	Protection	Minimum protective clothing
G	≤ 20 kJ	fundamental protection	Fundamental level Recommendation: 100% cotton clothing or equivalent
1	> 20 - ≤ 158 kJ	Basic protection	Protection level 1 Class 1 protective clothing (EN 61482-1-2) Supplement with protective helmet with visor or protective hood, arc resistant insulating gloves or heat protection gloves
2	> 158 - ≤ 318 kJ	High protection	Protection level 2 Class 2 protective clothing (EN 61482-1-2) Supplement with protective helmet with visor or protective hood, arc resistant insulating gloves or heat protection gloves
X	> 318 kJ	No verified protection possible	Determine alternative working procedures or work locations.⁸²

Table A3.3.2a: PPE-E protective clothing levels

Protection against electrical current must always be ensured when working in the vicinity of live parts and carrying out live working². When carrying out live working¹, protection against electrical current must be selected in accordance with the situation as per the risk assessment.

In general, the following is considered protective clothing: Upper body clothing that covers the hips (otherwise supplemented with protective trousers), long-sleeved, worn fastened. If there is danger from below, add protective trousers as per risk assessment. For live working², long trousers with the same protection level as the upper body clothing must be worn.

To keep the personal protective equipment for protection against electrical hazards in good condition, care and maintenance are required. The user is responsible for this⁸³. Please observe the manufacturer specifications regarding duration of use, storage, care and maintenance. Manipulation by the user is not permitted. Repairs must be carried out in accordance with the manufacturer specifications.

The protection levels to be used for specific activities can be found in regulations R2.5.3.X.

⁸² A risk assessment with calculation of the equivalent arc energy is permitted. The equivalent arc energy must be ≤ 318 kJ.

⁸³ At high-level Swisscom (Broadcast) AG sites, where personal protective equipment for protection against electrical hazards is kept in one place for logistical reasons, the Swisscom (Broadcast) AG electrical safety officer (B3.2.2b) is responsible for care and maintenance [1006]

The following tables define the necessary protection levels for personal protective equipment for protection against electrical hazards by calculating the equivalent arc energy and then generalising it. The following shows the meaning of the symbols in the tables:






Colour	Risk	PPE-E protection
	Low risk	fundamental protection
	Moderate risk	Basic protection
	Considerable risk	High protection
	High risk	No verified protection possible
	Low to high risk	As per tables A3.3.2.X

Table A3.3.2b: PPE-E protective clothing level symbols

Please note the conditions assumed by the compiler of the tables when performing the calculations. If work cannot be carried out within these conditions, the nominated person in control of an electrical installation during work activities must carry out a risk assessment with calculation of the equivalent arc energy. The equivalent arc energy must be ≤ 318 kJ.

Third party proprietors, such as electrical companies, must determine the use of personal protective equipment for protection against electrical hazards using situational risk assessments.

 At Swisscom only verified products can be used.

A3.3.2.1 PPE-E selection according to protective device and voltage

A3.3.2.1a NH fuse for low and extra-low voltage

The table below must be used under the following conditions:

Protective device:	NH fuse 500 V
Voltage:	L-PE ≤ 230 V AC
Maximum short-circuit current:	L-PE ≤ 30 kA
Electrical arc exposure time:	≤ 500 ms
Distance to work location:	≥ 300 mm
Criterion for PPE-E:	Back-up fuse, box and shut-off time




Back-up fuse (I _N)	SMALL BOXES 		MEDIUM BOXES 		LARGE BOXES 	
	Shut-off time (s)		Shut-off time (s)		Shut-off time (s)	
	≤ 0.1	$> 0.1 \leq 5.0$	≤ 0.1	$> 0.1 \leq 5.0$	≤ 0.1	$> 0.1 \leq 5.0$
16	Green	Green	Green	Yellow	Green	Yellow
20	Green	Yellow	Green	Yellow	Yellow	Yellow
25	Green	Yellow	Yellow	Yellow	Yellow	Yellow
32	Green	Yellow	Yellow	Yellow	Yellow	Yellow
40	Green	Yellow	Yellow	Yellow	Yellow	Yellow
50	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
63	Yellow	Yellow	Yellow	Yellow	Yellow	Orange
80	Yellow	Yellow	Yellow	Orange	Yellow	Orange
100	Yellow	Yellow	Yellow	Orange	Yellow	Red
125	Yellow	Yellow	Yellow	Orange	Yellow	Red
160	Yellow	Orange	Yellow	Red	Orange	Red
200	Yellow	Orange	Orange	Red	Orange	Red
224	Yellow	Orange	Orange	Red	Orange	Red
250	Yellow	Orange	Orange	Red	Orange	Red
315	Yellow	Red	Orange	Red	Red	Red
355	Yellow	Red	Orange	Red	Red	Red
400	Orange	Red	Red	Red	Red	Red
500	Orange	Red	Red	Red	Red	Red
630	Orange	Red	Red	Red	Red	Red
800	Red	Red	Red	Red	Red	Red
1000	Red	Red	Red	Red	Red	Red
1250	Red	Red	Red	Red	Red	Red

Table A3.3.2.1a: PPE-E selection for NH fuse for low and extra-low voltage

A3.3.2.1b Miniature circuit breaker for low and extra-low voltage

The table below must be used under the following conditions:

Protective device:	MCB
Voltage:	L-PE ≤ 230 V AC
Maximum short-circuit current:	L-PE ≤ 10 kA
Electrical arc exposure time:	≤ 500ms
Distance to work location:	≥ 300mm
Criterion for PPE-E:	Back-up fuse, box and shut-off time




Back-up fuse (I _N)	SMALL BOXES 		MEDIUM BOXES 		LARGE BOXES 	
	Shut-off time (s)		Shut-off time (s)		Shut-off time (s)	
	≤ 0.1	> 0.1 ≤ 5.0	≤ 0.1	> 0.1 ≤ 5.0	≤ 0.1	> 0.1 ≤ 5.0
10						
16						
20						
25						
32						
40						
50						
63						
80						
100						
125						

Table A3.3.2.1b: PPE-E selection miniature circuit breaker low and extra-low voltage

A3.3.2.1c Power circuit breaker low and extra-low voltage

The table below must be used under the following conditions:

Protective device:	ACB / MCCB
Protective relay:	Instantaneous overcurrent protection I (ANSI 50) must be activated
Voltage:	L-PE \leq 230 V AC
Maximum short-circuit current:	See table
Electrical arc exposure time:	\leq 500ms
Distance to work location:	\geq 300mm
Criterion for PPE-E:	Box and short-circuit current




Short-circuit current (kA)	SMALL BOXES 	MEDIUM BOXES 	LARGE BOXES 
≤ 0.8	Green	Green	Green
$> 0.8 - \leq 1$	Green	Green	Yellow
$> 1 - \leq 1.9$	Green	Yellow	Yellow
$> 1.9 - \leq 6.3$	Yellow	Yellow	Yellow
$> 6.3 - \leq 8$	Yellow	Yellow	Orange
$> 8 - \leq 12.6$	Yellow	Orange	Orange
$> 12.6 - \leq 15$	Yellow	Orange	Red
$> 15 - \leq 16$	Orange	Orange	Red
$> 16 - \leq 30$	Orange	Red	Red
$> 30 - \leq 50$	Red	Red	Red

Table A3.3.2.1c: PPE-E selection circuit breaker low and extra-low voltage

A3.3.2.1d NH Fuse telecommunications installations

The table below must be used under the following conditions:

Protective device:	NH fuse 500 V
Voltage:	Minus -PE ≤ 54 V DC
Maximum short-circuit current:	L-PE maximum 50 kA
Electrical arc exposure time:	≤ 500 ms
Distance to work location:	≥ 300 mm
Criterion for PPE-E:	Box and shut-off time



Equipment	Back-up fuse (I_N)	Box	PPE-E level
Series feed distributor	Maximum 630 A	Medium	Basic protection (protection level 1) 
Power supply system	Maximum 3 x 1000 A	Large	As per batteries table A3.3.2.2.X 

Table A3.3.2.1d: PPE-E selection NH fuse telecommunications installations

A3.3.2.2 PPE-E selection for battery installations

A3.3.2.2a General

The table below must be used under the following conditions:

Protective device:	None
Battery type:	Unknown
Box:	Large
Electrical arc exposure time:	$\leq 500\text{ms}$
Distance to work location:	$\geq 300\text{mm}$
Criterion for PPE-E:	Electrical charge

Type of secondary battery	Voltage	PPE-E basic protection	PPE-E high protection	PPE-E No protection available
Unit	V DC	Ah	Ah	Ah
Closed	≤ 24	≤ 2400	> 2400 ≤ 4800	> 4800
Sealed and gas-tight	≤ 24	≤ 480	> 480 ≤ 960	> 960
Closed	> 24 ≤ 48	≤ 1200	> 1200 ≤ 2400	> 2400
Sealed and gas-tight	> 24 ≤ 48	≤ 240	> 240 ≤ 480	> 480
Closed	> 48 ≤ 240	≤ 240	> 240 ≤ 480	> 480
Sealed and gas-tight	> 48 ≤ 240	≤ 48	> 48 ≤ 96	> 96
Closed	> 240 ≤ 480	≤ 120	> 120 ≤ 240	> 240
Sealed and gas-tight	> 240 ≤ 480	≤ 24	> 24 ≤ 48	> 48
Closed	> 480 ≤ 960	≤ 60	> 60 ≤ 120	> 120
Sealed and gas-tight	> 480 ≤ 960	≤ 12	> 12 ≤ 24	> 24

Table A3.3.2.2a: PPE-E selection battery installations general

NOTE: In case of doubt the row for sealed and gas-tight secondary batteries should be used.

A3.3.2.2b Product-specific Swisscom

The table below must be used under the following conditions:

Protective device:	None
Battery type:	Known
Electrical arc exposure time:	≤ 500ms
Distance to work location:	≥ 300mm
Criterion for PPE-E:	Battery type, box and electrical charge

Battery type	Type of secondary battery	Box	Voltage	PPE-E fundamental protection	PPE-E basic protection	PPE-E high protection	PPE-E No protection available
			V DC		Ah	Ah	Ah
PowerSafe OPzS	Closed	Large	53.52		≤ 1625	> 1625 ≤ 3360	> 3360
PowerSafe SBS	Sealed	Medium	54.96	≤ 31	> 31 ≤ 900	> 900Ah	
Ericsson 6612	Gas-tight (Li-ion)	Medium	54.6	≤ 100			

Table A3.3.2.2b: PPE-E selection battery installations product-specific Swisscom

A3.3.2.3 PPE-E definition of boxes




	Symbol	Properties	Example	Image
Small boxes		Box with rear and side wall Dimensions 25cm x 25cm	Domestic junction box Compact flush-mounted distributor Draw-out technology Energy switchgear combination	In progress
Medium boxes		Box with rear wall but no side wall Dimensions 100cm x 100cm	Aluminium frame Battery in rack	In progress
Large boxes		Box without rear or side wall	Open distribution installations Batteries on frame	In progress

Table A3.3.2.3: PPE-E definition of boxes

A3.3.2 E+E PPE-E examples – protective levels

(SC) Personal protective equipment for protection against electrical hazards must generally comply with EN 61482-1-2.

A3.3.2a E+E PPE-E example – fundamental protection (fundamental level)



Figure A3.3.2a.1:
Electrical polo shirt made from cotton



Figure A3.3.2a.2:
Electrical work trousers made from cotton

A3.3.2b E+E PPE-E example – basic protection (protection level 1)



Figure A3.3.2b.1:
Electrical polo shirt class 1



Figure A3.3.2b.2:
Electrical work trousers class 1



Figure A3.3.2b.3:
Electrical safety helmet class 1



Figure A3.3.2b.4:
Electrical safety hood class 1



Figure A3.3.2b.5:
Heat protection gloves
Class 1
(Operating activities)



Figure A3.3.2b.6:
Undergloves
(Kevlar)



Figure A3.3.2b.7:
Insulating gloves

Protection class 00	(500V)
Protection class 0	(1000 V)
Protection class 1	(7500V)
Protection class 2	(17000V)
Protection class 3	(26500V)

A3.3.2c E+E PPE-E example – high protection (protection level 2)



Figure A3.3.2c.1:
Electrical jacket class 2



Figure A3.3.2c.2:
Electrical work trousers class 2



Figure A3.3.2c.3:
Electrical safety helmet class 2



Figure A3.3.2c.4:
Electrical safety hood class 2



Figure A3.3.2c.5:
Heat protection gloves
Class 2
(Operating activities)



Figure A3.3.2c.6:
Undergloves
(Kevlar)



Figure A3.3.2c.7:
Insulating gloves

Protection class 00	(500V)
Protection class 0	(1000 V)
Protection class 1	(7500V)
Protection class 2	(17000V)
Protection class 3	(26500V)

A4.0.1 Document filing

Document filing is the responsibility of the nominated person in control of an electrical installation during work activities⁸⁴. The documents must be filed as described below:

Work application:	pdf in the Electrical_Work_Application folder for the relevant object on the electronic platform of the respective SC organisational unit;
Installation notification:	pdf in the Electrical_Installation_Notification folder for the relevant object on the electronic platform of the respective SC organisational unit;
Safety dossier:	pdf in the Electrical_Safety_Dossier folder for the relevant object on the electronic platform of the respective SC organisational unit; Hard copy originals are filed in a folder ⁸⁵ . The following objects are used depending on the object size: Large object (e.g. data centre, business park): <ul style="list-style-type: none"> • Folder for each object; • Register for each storey (for template see A4.0.1a). Medium and small objects: <ul style="list-style-type: none"> • Register for each object (for template see A4.0.1b).
Inspection reports:	pdf in the Electrical_Inspection_Report folder for the relevant object on the electronic platform of the respective SC organisational unit;
Lightning protection protocol:	pdf in the Electrical_Lightning_Protection folder for the relevant object on the electronic platform of the respective SC organisational unit; Hard copy originals are filed in the same folder as the safety dossier ⁸⁵ . The following objects are used depending on the object size: Large object (e.g. data centre, business park): <ul style="list-style-type: none"> • Final register. Medium and small objects: <ul style="list-style-type: none"> • Register for each object (same register as safety dossier).
Plan permission:	pdf in the Electrical_Plan_Permission folder for the relevant object on the electronic platform of the respective SC organisational unit;
Thermography:	pdf in the Electrical_Thermography folder for the relevant object on the electronic platform of the respective SC organisational unit;
RCD inspection:	pdf in the Electrical_RCD_Inspection folder for the relevant object on the electronic platform of the respective SC organisational unit;
Register:	Word file in the Electrical_Safety_Dossier folder for the relevant object on the electronic platform of the respective SC organisational unit;
Third party proprietor:	Excel file in the Electrical_Safety_Dossier folder for the relevant object on the electronic platform of the respective SC organisational unit.

⁸⁴ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

⁸⁵ Optional: Only applies if documents are voluntarily filed as hard copies

Register folder for objects

Sicherheitsdossier Elektroanlagen	
WE Objekt:	XXXX-X
Adresse:	Strasse Nr., PLZ Ort
Zuständig:	Anlagenverantwortlicher
Datum:	25.07.2016
Ebene 1	1
Ebene 2	2
Ebene 3	3
Ebene 4	4
Ebene 5	5
Ebene 6	6
Ebene 7	7
Ebene 8	8
Ebene 9	9
Ebene 10	10
Ebene 11	11
Ebene 12	12
Ebene 13	13
Ebene 14	14
Ebene 15	15
Ebene 16	16
Ebene 17	17
Ebene 18	18
Verzeichnis Bewilligungsträger NIV Art.14 & Art.15 (IM-Provider (Verzeichnisse nach Jahr und Bewilligungsnummer sortiert))	
Bilfschutz	20

XXXX-X_Register Sicherheitsdossier 25.07.2016

Form A4.0.1a: Register folder for objects

Register folder for object group

Sicherheitsdossier Elektroanlagen	
Rayon:	XXXX
Zuständige OE:	XX-XX-XX-XX
Zuständig:	Anlagenbetreiber
Datum:	25.07.2016
WE Objekt:	Strasse Nr., PLZ Ort:
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
	15
	16
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	22
	23
	24
	25
	26

XXXX_Register Sicherheitsdossier 25.07.2016

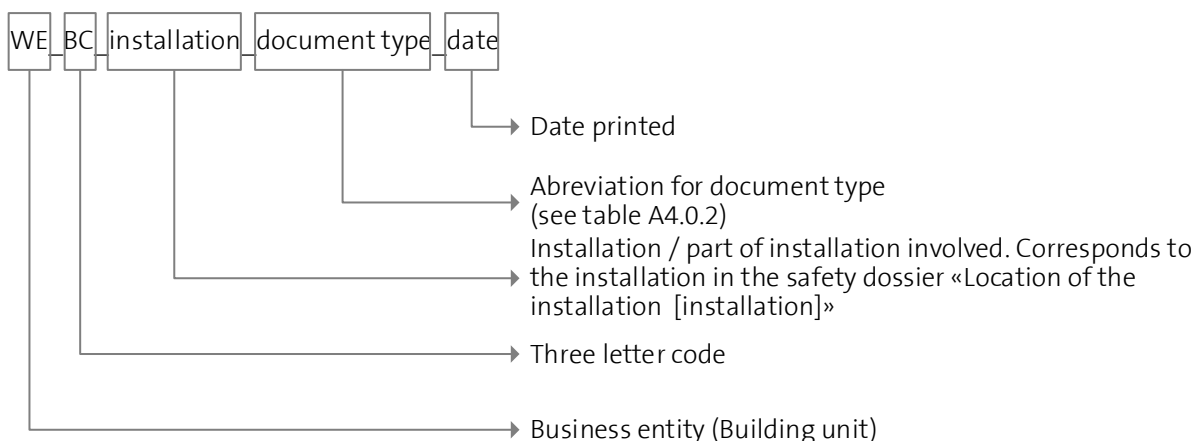
Form A4.0.1b: Register folder for object groups

Current specification documents: www.swisscom.ch/electro

A4.0.2 Document name

All electronic documents must be named as follows:

Name with business entity and three letter code

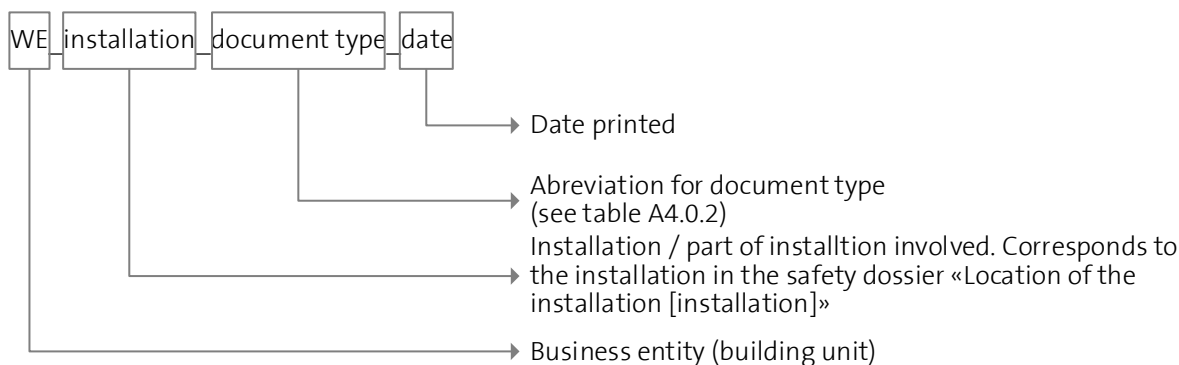


Examples:

1139-1_790ZHH_UV55341 Plug Socket Extension CEE32_AA_31.12.2020;
1139-1_790ZHH_UV42356 Office Conversion_IA_31.12.2020;
1139-1_790ZHH_HV NoBreak A 5.OG ost_SD_PK_31.12.2020.

Name with business entity

If there is no three or four letter code, the business entity should be used (this applies to objects in which no telecommunications installations are operated by Swisscom):

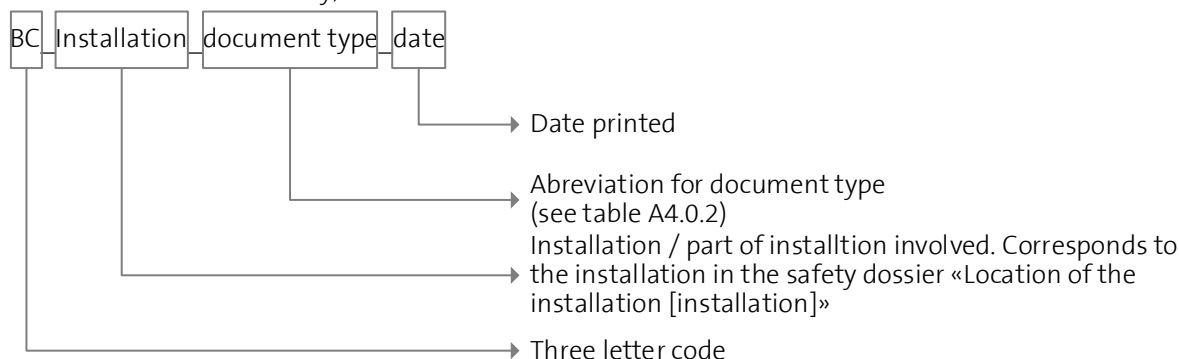


Examples:

1029-1_UV EG Plug Socket Extension 3xT13_SD_SK_AK_31.12.2020;
1032-1_UV 2.OG Office Conversion_IA_31.12.2020;
1116-1_H6482_03_O02.T03 SOC_SD_PK_31.12.2020.

Three/four letter code name

If there is no business entity, the 3LC or 4LC should be used:



Examples:

790MUT_connection conversion MOB-NOT_AA_31.12.2020;

790MUVT_PUS-OC_SD_PK_31.12.2020;

ZUFI_MBL_SD_SK_AK_31.12.2020;

CHRI_Main Distribution Board_SD_SK_AK_31.12.2020;

CHRI_Main Distribution Board_FM_31.12.2020;

CHRI_Power Off Test_SA_31.12.2020.

Abbreviations for document types

Abbreviation	Full word	Comment
AA	Work application	
DBI	Third party proprietor	
SA	Switching order	May also include a schedule and/or work programme
IA	Installation notification	
SD	Safety dossier	General name, document has no legal validity
SD_EP	Safety dossier, initial inspection	Includes a legally valid measurement and testing report, and may also include the measurement report from the initial inspection
SD_SK	Safety dossier, final inspection	Includes a legally valid safety record and measurement and testing report, and may also include the measurement report from the initial inspection
SD_AK	Safety dossier, acceptance inspection	Includes a legally valid safety record and measurement and testing report, and may also include the measurement report from the acceptance inspection
SD_SK_AK	Safety dossier, final and acceptance inspection	Includes a legally valid safety record and measurement and testing report, and may also include the measurement report from the final and acceptance inspection

Abbreviation	Full word	Comment
SD_PK	Safety dossier, periodic inspection	Includes a legally valid safety record and measurement and testing report, and may also include the measurement report from the periodic inspection
RSD	Register safety dossier	
KB	Inspection report	General name for inspection reports, lists of findings or lists of deficiencies
PLPS_EP	Lightning protection protocol, initial inspection	
PLPS_AK	Lightning protection protocol, acceptance inspection	
PLPS_PK	Lightning protection protocol, periodic inspection	
PG	Plan approval	

Table A4.0.2: Abbreviations for document types

NOTE: When sending emails to the electro.installation@swisscom.com address the respective organisational unit of the group company according to table A4.0.3 must be included in the subject line. Emails without the organisational unit of the group company will be returned and not processed. The documents will be considered not delivered.

In order, to forward the documents quickly to the responsible bodies, the correct name of the respective organisational unit of the group company responsible.

Example:



 Senden

Von 

 An
 Cc

max.muster@bluewin.ch

electro.installation@swisscom.com

Betreff IIP 1139-1_UV A12345_SD_2017-05-25


 1139-1_UV A12345_SD_22.07.2016.pdf
 238 KB

Figure A4.0.2: Email to electro.installation@swisscom.com

A4.0.3 Document forwarding

Correspondence address for the distribution network operator:

Swisscom AG
Electro Installation
Alte Tiefenastrasse 6
Postfach
CH-3050 Bern
electro.installation@swisscom.com

The following rules are set up for the electro.installation@swisscom.com email address:

Subject	Forward to	Correspondence address / contact person	Comment
SCS	sina.rs@ch.issworld.com	ISS Facility Services AG SiNa Swisscom Grubenstrasse 11 3322 Urtenen-Schönbühl Dimitris Imboden 079 699 47 64 Dimitris.Imboden@ch.issworld.com	Office building infrastructure
			Operations building infrastructure
			Fixnet and telecommunications installations 48 V DC
MCS	MCS-OLMobile-Net@swisscom.com	Swisscom (Schweiz) AG Mobile Control Center Swisscom Gasse 4601 Olten Roland Arnold 0800 365 724	Mobile
SBC	teamop-fma.sbc@swisscom.ch	Swisscom Broadcast AG Ostermundigenstrasse 99 3050 Bern Peter Trachsel 058 221 51 52	Broadcasting transmission installations

Table A4.0.3: Document forwarding

A4.0.4 SC **Measurement report update process**

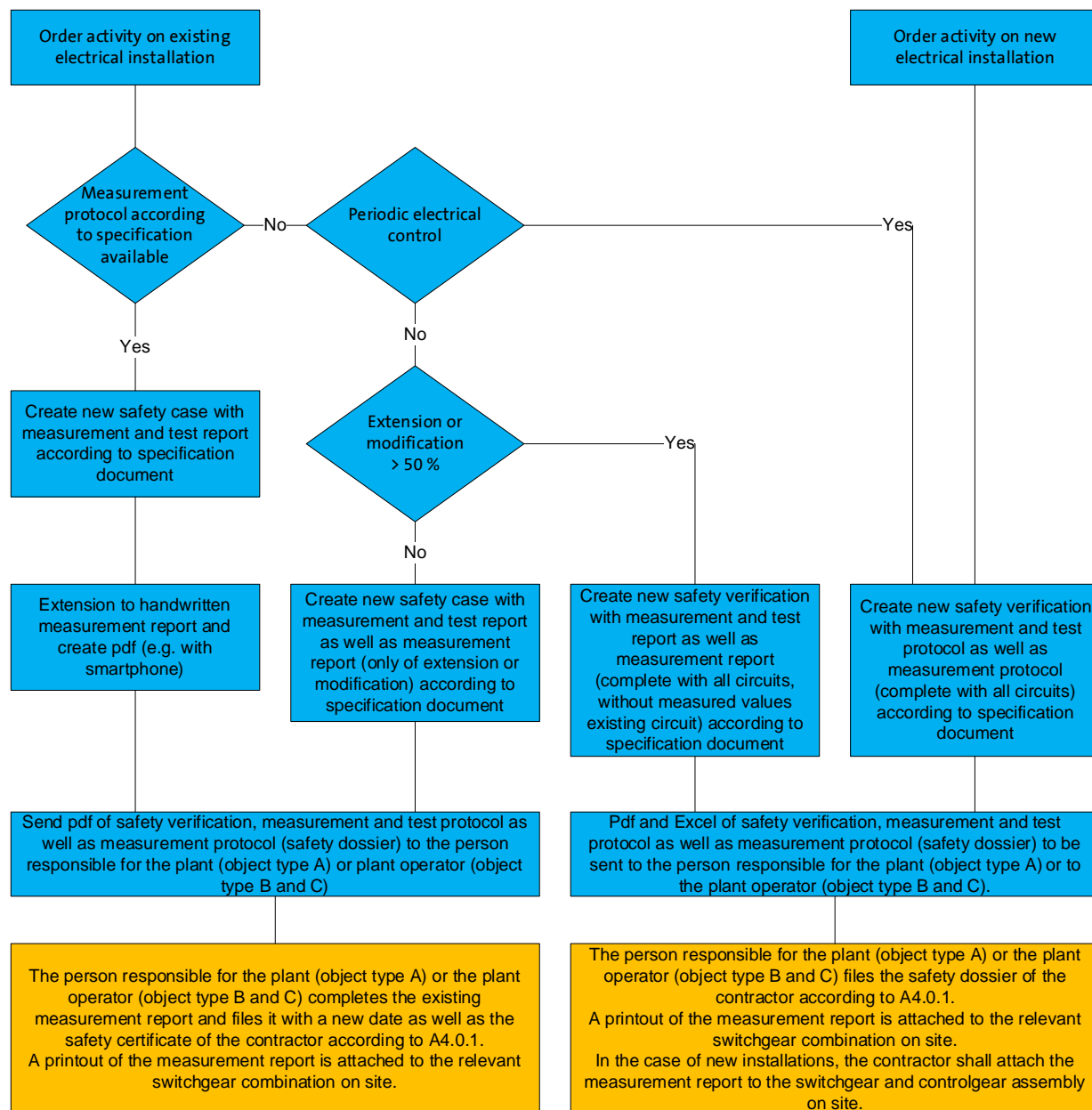


Chart A4.0.4: Measurement report update process

A4.0.5 Inspection scope [103]




The following list shows a selection of inspection procedures which must be taken into account in general, providing these points are applicable to the installation. [32]

During the initial inspection (EP), the final inspection (SK) and periodic inspections (PK) the entire installation will be inspected in each case. During the acceptance inspection (AK) and the spot check (SP), mainly random checks will be carried out.

The relevant documents (A4.0.6) must be produced for the inspection of the installations.

For inspection of the installations, the relevant records showing the circuit setup, the room type and layout, the type of preventive measures and so on, must be available.

Key:

-  Full inspection/measurement
-  Random checks
-  Optional

Visual inspection Verification objectives	General					Telecommunications installations 48 V DC				
	EP	SK	AK	PK	SP	EP	SK	AK	PK	SP
Compliance with the safety requirements, e.g. contact protection guaranteed, no damage and the like	●	●	●	●	⌚	●	●	●	●	⌚
Correct selection of equipment according to the room type	●	●	●	●	⌚	●	●	●	●	⌚
Presence of prescribed labels and certification marks	●	●	⌚	●	⌚	●	●	⌚	●	⌚
Observance of any technical records supplied by the manufacturer	●	●	⌚	●	⌚	●	●	⌚	●	⌚

Table A4.0.5.1: Inspection scope – visual inspection verification objectives

Visual inspection Scope	General					Telecommunications installations 48 V DC				
	EP	SK	AK	PK	SP	EP	SK	AK	PK	SP
Use of preventive measures to protect against electric shock	●	●	●	●	⌚	⌚	⌚	⌚	⌚	⌚
Use of preventive measures to protect against electrical power sources [26] Art. 5.3	⌚	⌚	⌚	⌚	⌚	●	●	●	●	⌚
Fire stops in place, protection against the effects of heat, spreading fire, etc.	●	●	⌚	●	⌚	●	●	⌚	●	⌚
Choice of conductor has the appropriate current-carrying capacity	●	●	⌚	●	⌚	●	●	⌚	●	⌚
Choice of conductor has the appropriate voltage drop	●	●	⌚	⌚	⌚	●	●	●	●	⌚

Visual inspection Scope	General					Telecommunications installations 48 V DC				
	EP	SK	AK	PK	SP	EP	SK	AK	PK	SP
Selection, use, selectivity and coordination of safety and monitoring equipment	●	●	●	●	◐	●	●	●	●	◐
Selection, configuration and installation of suitable surge protection devices (SPD)	●	●	●	●	◐	●	●	●	●	◐
Selection, configuration and installation of separating and switching devices	●	●	●	●	◐	●	●	●	●	◐
Selection of equipment and preventive measures corresponding to the external influences and mechanical stress	●	●	●	●	◐	●	●	●	●	◐
Identification of the protective conductor, PEN conductor and neutral conductor	●	●	●	●	◐	◐	◐	◐	◐	◐
Identification of the protective conductor, PEL conductor and L+ / L- phase conductor	◐	◐	◐	◐	◐	●	●	●	●	◐
Availability of technical records, diagrams, warning and prohibition signs, and other similar information	●	●	●	●	◐	●	●	●	●	◐
Identification of the circuit, over-current protection devices, switch, terminals, etc.	●	●	◐	●	◐	●	●	◐	●	◐
Proper cable and conductor terminals and connections	●	●	◐	●	◐	●	●	◐	●	◐
Availability and correct use of earthing systems, protective conductors, including protective equipotential bonding conductors for protective equipotential bonding and additional equipotential bonding and their connections to the main earthing busbar.	●	●	◐	●	◐	●	●	◐	●	◐
Equipment that must be used and maintained is easily accessible.	●	●	◐	●	◐	●	●	◐	●	◐
Measures to protect against electromagnetic faults	●	●	◐	●	◐	●	●	◐	●	◐
Connection of the body to the earthing system and conductor connections relating to protection against unintended loosening, measurement and positioning	●	●	◐	●	◐	●	●	◐	●	◐
Selection and setup of cable and conductor systems	●	●	◐	●	◐	●	●	◐	●	◐

Table A4.0.5.2: Inspection scope visual inspection

Testing and measurement	General					Telecommunications installations 48 V DC				
	EP	SK	AK	PK	SP	EP	SK	AK	PK	SP
Continuity of the conductors, especially the conductivity of the protective conductor, the protective equipotential bonding conductor, the additional protective equipotential bonding conductor and the functional protective equipotential bonding conductor	●	●	●	●	◐	●	●	●	●	◐
Insulation resistance of electrical installation	●	●	◐	●	◐	●	●	◐	●	◐
Differential current of final circuits (if insulation measurement is not possible)	◐	◐	◐	●	◐	◐	◐	◐	●	◐
Insulation resistance for confirmation of effectiveness of protection by SELV, PELV or protective isolation	●	●	◐	●	◐	●	●	◐	●	◐
Insulation resistance/impedance of insulating floors and insulating walls	●	●	◐	●	◐	◐	◐	◐	◐	◐
Polarity (connection of sockets, switching and safety devices to external/neutral conductor)	●	●	◐	●	◐	●	●	◐	●	◐
Inspection to confirm effectiveness of protection against automatic power supply shut-off	●	●	◐	●	◐	◐	◐	◐	◐	◐
Inspection to confirm effectiveness of additional preventive measures	●	●	◐	●	◐	◐	◐	◐	◐	◐
Direction of rotation	●	●	◐	●	◐	◐	◐	◐	◐	◐
Inspection of function	●	●	◐	●	◐	●	●	◐	●	◐
Voltage drop	●	●	◐	●	◐	●	●	◐	●	◐

Table A4.0.5.3: Inspection scope testing and measurement

A4.0.6 Documentation [103]

Documents are produced for all inspection procedures. When the work is finished these are handed over to the electrical installation owner, who retains them until the next inspection. The electrical installation owner must deliver a copy of the safety record to each of the network operators. If the electrical installation owner agrees, the electrical installer or the independent inspection body can also send the copies of the safety record to the network operators. The following table shows which party produces the documents (implementation) and which party is responsible for ensuring that the documents are available.

Key:

- A Electrical company with general installation permit
- B Electrical installation owner
- E Permit holder with restricted authorisation
- K Independent supervisory body or accredited inspection body
- N Network operator

Document	Implementation						Responsibility					
	EP		SK	AK	PK	SP	EP		SK	AK	PK	SP
Report	A	E	A	K	K	N	A	E	A	K	K	
Measurement and testing report ⁸⁶	A	E	A	K	K	N	A		A	K	K	
Safety record			A	K	K				A	B	B	N

Table A4.0.6: Documentation

⁸⁶ For permit holder with restricted permit: Statement

A4.0.7 Schedule for notification and inspections [103]

To give a better overview, the workflows for the individual activities and operations for each order and type of permit are shown below. [6] They do not include any Swisscom -specific provisions. These can be found in section 4 and the related attachments.

A4.0.7.1 General installation permit

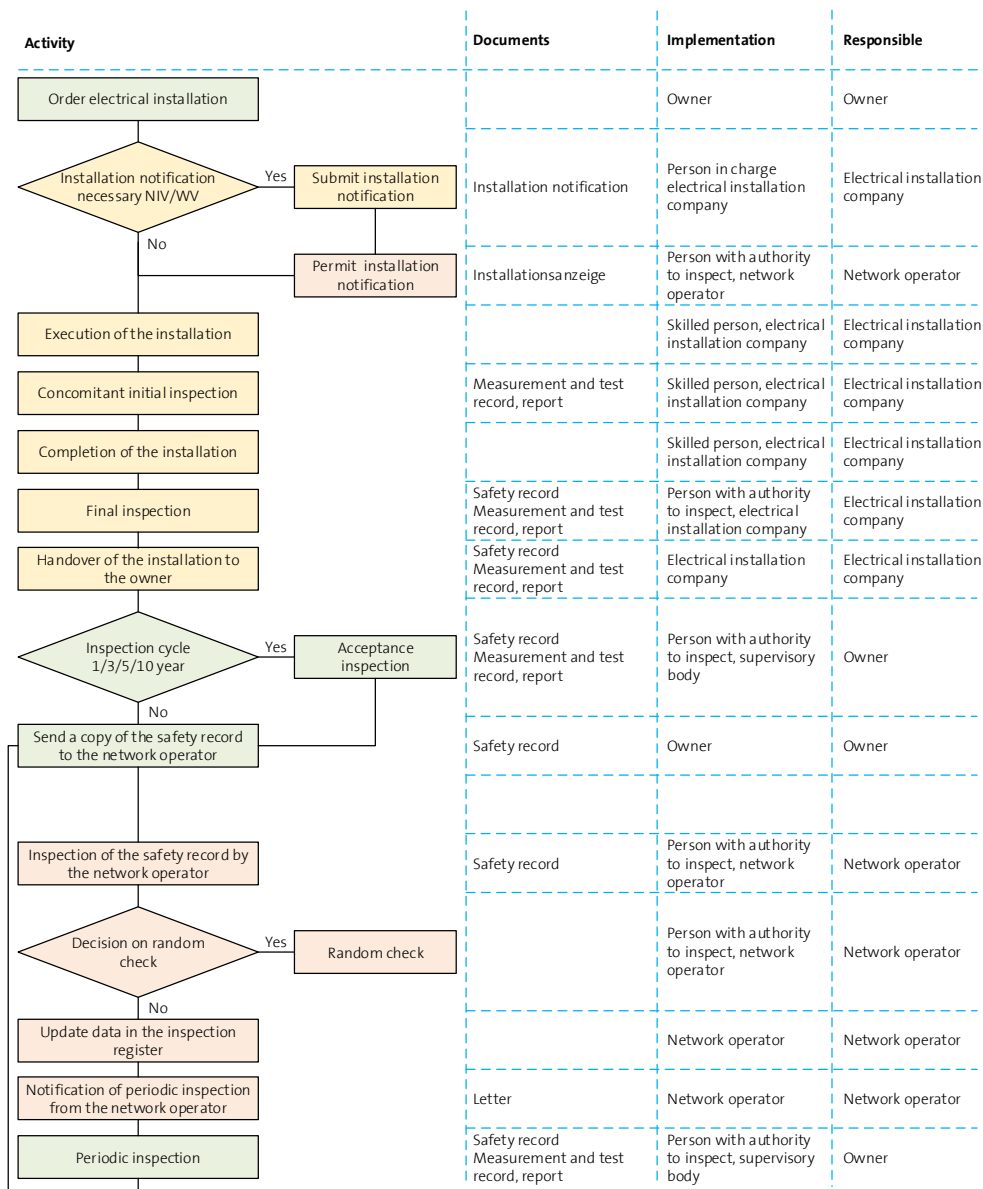


Chart A4.0.7.1: General installation permit notification and inspections schedule

A4.0.7.2 General installation permit (special installation)

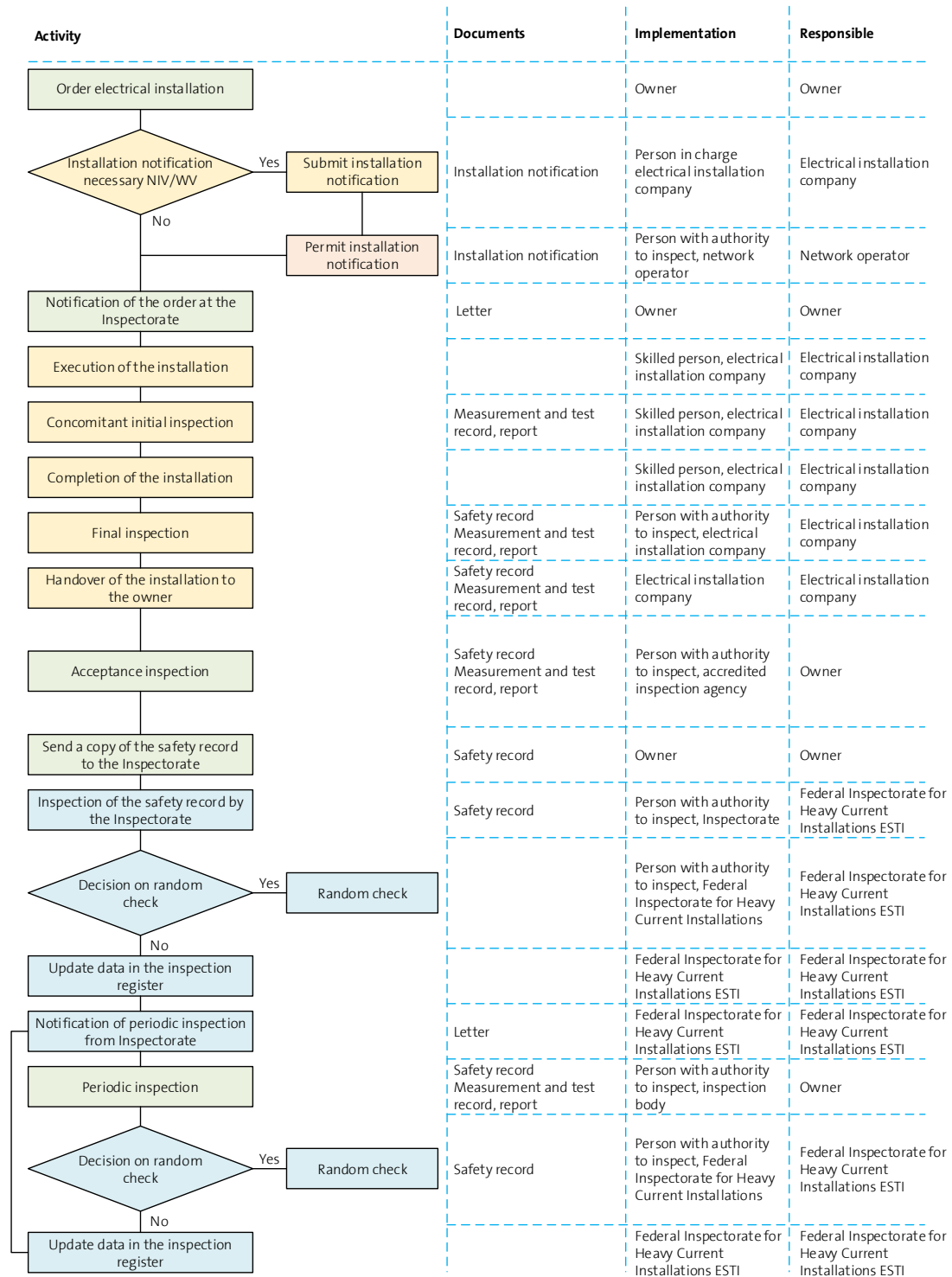


Chart A4.0.7.2: General installation permit notification and inspections schedule – special installation

A4.0.7.3 Restricted installation permit

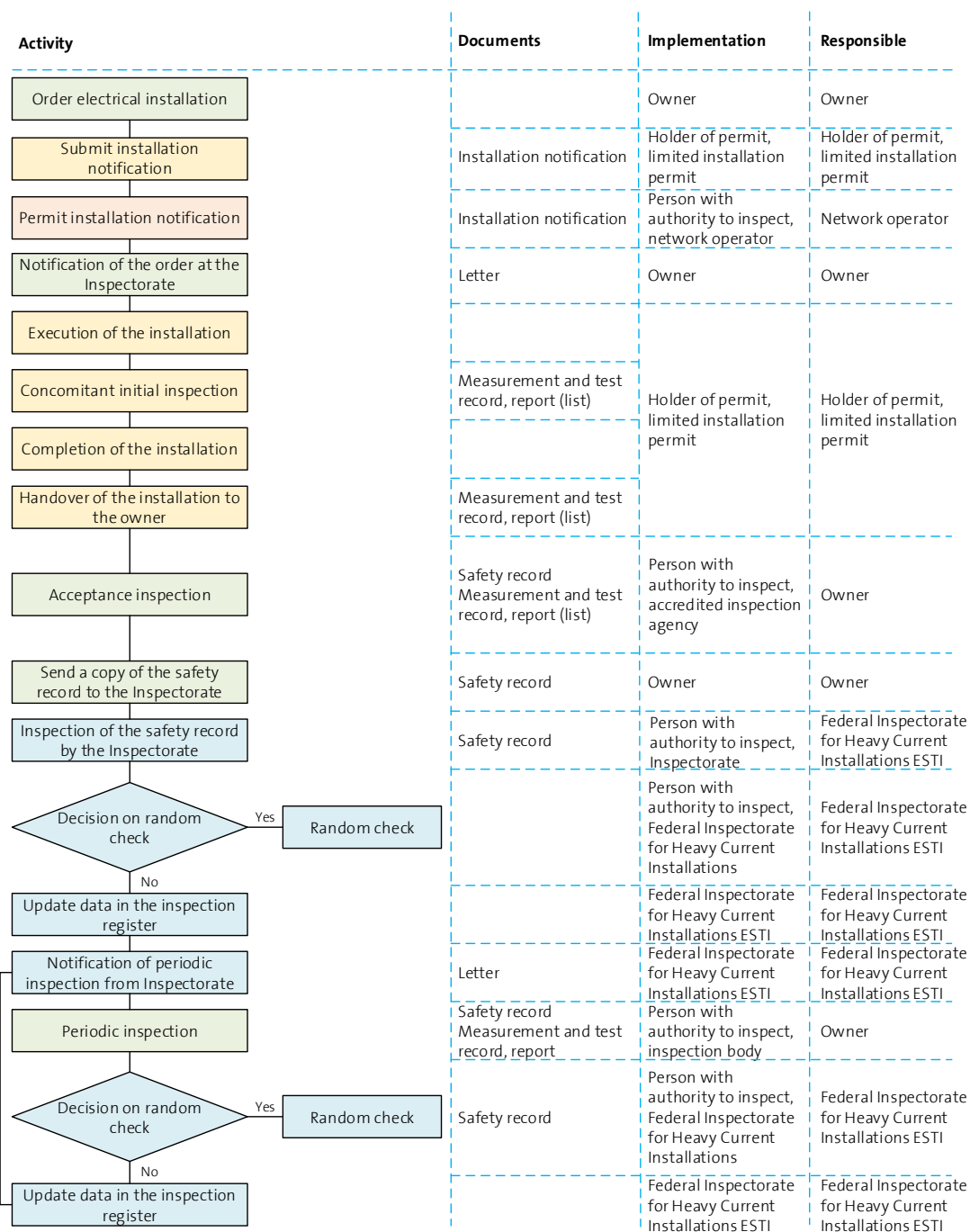


Chart A4.0.7.3: Restricted installation permit notification and inspections schedule

A4.0.8 Signatures [103]

In order for the safety record to comply with the ordinances, the document must be signed correctly. This means that the safety record must be signed by hand or electronically, using a qualified electronic signature. If it is signed by hand, please ensure that the name of the signatory is identifiable (name must also be written in block capitals). The same applies for the measurement and testing reports and other reports.

If a qualified electronic signature is used, a signature on the safety record is sufficient for the whole safety dossier (safety record, measurement and testing report, measurement report; conformity declaration)

Swisscom welcomes and encourages qualified electronic signatures.

A4.0.8.1 Safety record

The following signatures are required on the safety record[6]:

Signature	Inspection type			
	Final inspection	Acceptance inspection	Periodic inspection	Random check inspection
Electrical company: Person with authority to inspect, with or without installation permit or Inspection body: Person with authority to inspect, with inspection permit	1			
Electrical company: Person with authority to inspect, with installation permit or Person with authority to act as sole signatory	2			
Inspection body Person with authority to inspect, with inspection permit		3⁸⁷	3⁸⁷	
Network operator Person with authority to inspect, with or without installation permit				4

Table A4.0.8.1: Safety record signatures

⁸⁷ For special installations as per NIV: accredited inspection body

Unterschrift Elektro-Installateur Sicherheitsberater Bewilligungs-Inhaber <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 2px solid orange; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-weight: bold; font-size: 20px;">1</div> <div style="border: 2px solid orange; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-weight: bold; font-size: 20px;">2</div> </div>		Unterschrift unabhängiges Kontrollorgan Sicherheitsberater <div style="border: 2px solid green; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-weight: bold; font-size: 20px;">3</div>
Datum:		Datum:
Beilagen <input type="checkbox"/> Mess- und Prüfprotokoll <input type="checkbox"/> Messprotokoll <input type="checkbox"/> Protokoll der unabhängigen Kontrolle	Verteiler <input type="checkbox"/> Eigentümer <input type="checkbox"/> Verwaltung <input type="checkbox"/> Netzbetreiber / Inspektorat	
Netzbetreiber / Inspektorat Eingang Visum	Stichprobe <input type="checkbox"/> Ja <input type="checkbox"/> Nein Datum Visum	<div style="border: 2px solid orange; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; font-weight: bold; font-size: 20px;">4</div> Ergebnisse <input type="checkbox"/> Keine Mängel festgestellt <input type="checkbox"/> Mängelbericht erstellt <input type="checkbox"/> Anlage plombiert

Figure A4.0.8.1: Safety record extract

A4.0.8.2 Measurement and testing report

The following signatures are required on the measurement and testing report:

Signature	Inspection type			
	Initial inspection	Final inspection	Acceptance inspection	Periodic inspection
Electrical company: Electrical installer with EFZ [Swiss Certificate of Competence], installation electrician with EFZ or similar qualification	1			
Electrical company: Person with authority to inspect, with or without installation permit or Inspection body: Person with authority to inspect, with inspection permit		1		
Electrical company: Person with authority to inspect, with installation permit or Person with authority to act as sole signatory		2		
Inspection body Person with authority to inspect, with inspection permit			3⁸⁸	3⁸⁸

Table A4.0.8.2: Measurement and testing report signatures

⁸⁸ For special installations as per NIV: accredited inspection body

Figure A4.0.8.2: Measurement and testing report extract

A4.0.8.3 Statement

Signature	Inspection type			
	Initial inspection	Final inspection	Acceptance inspection	Periodic inspection
Authorisation holder with restricted installation authorisation	1			
Accredited inspection body Person with authority to inspect, with inspection permit			3	

Table A4.0.8.3: Measurement and testing report signatures

Figure A4.0.8.3: List of restricted permits

A4.1.2.1 Installation notification reporting process

A4.1.2.1.1 Site network operator Swisscom AG

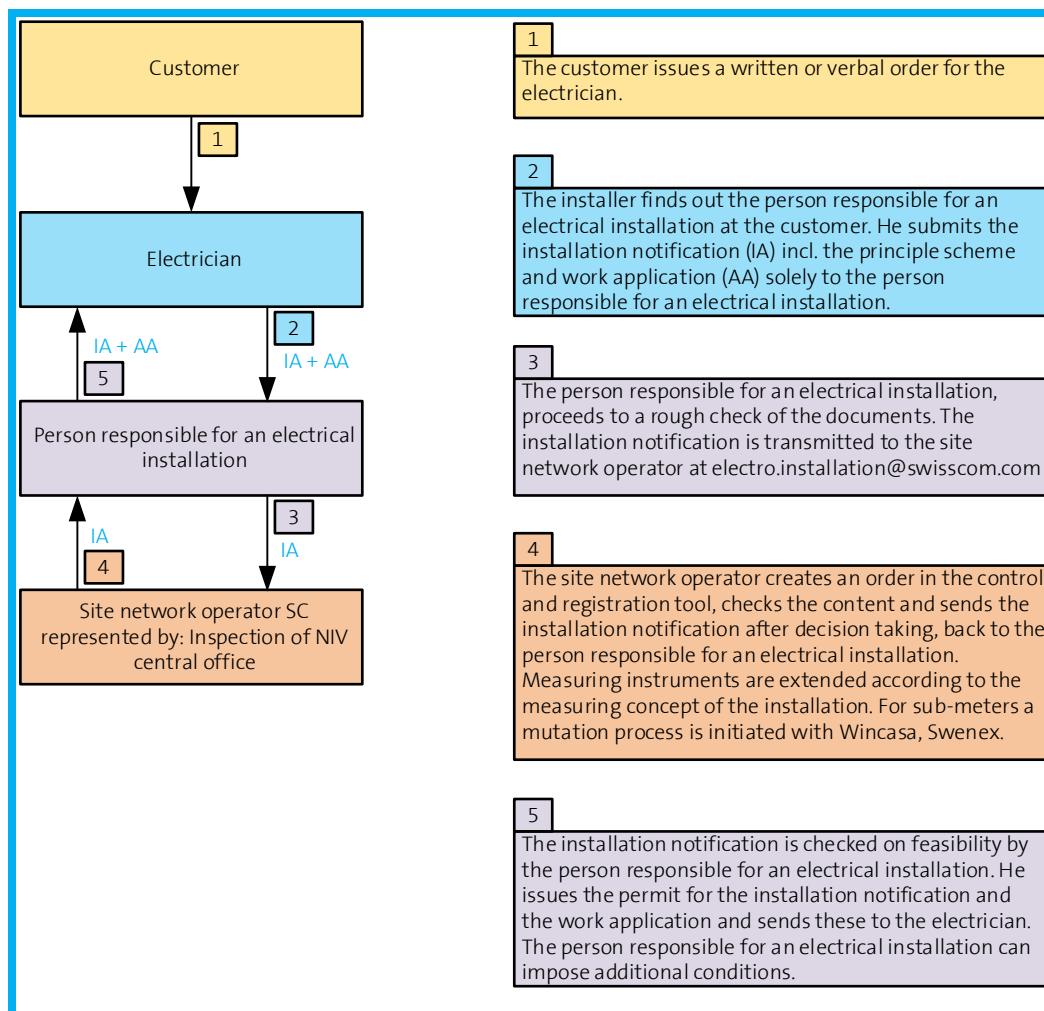


Chart A4.1.2.1.1: Site network operator installation notification process [6]

NOTE: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

A4.1.2.1.2 Distribution network operator

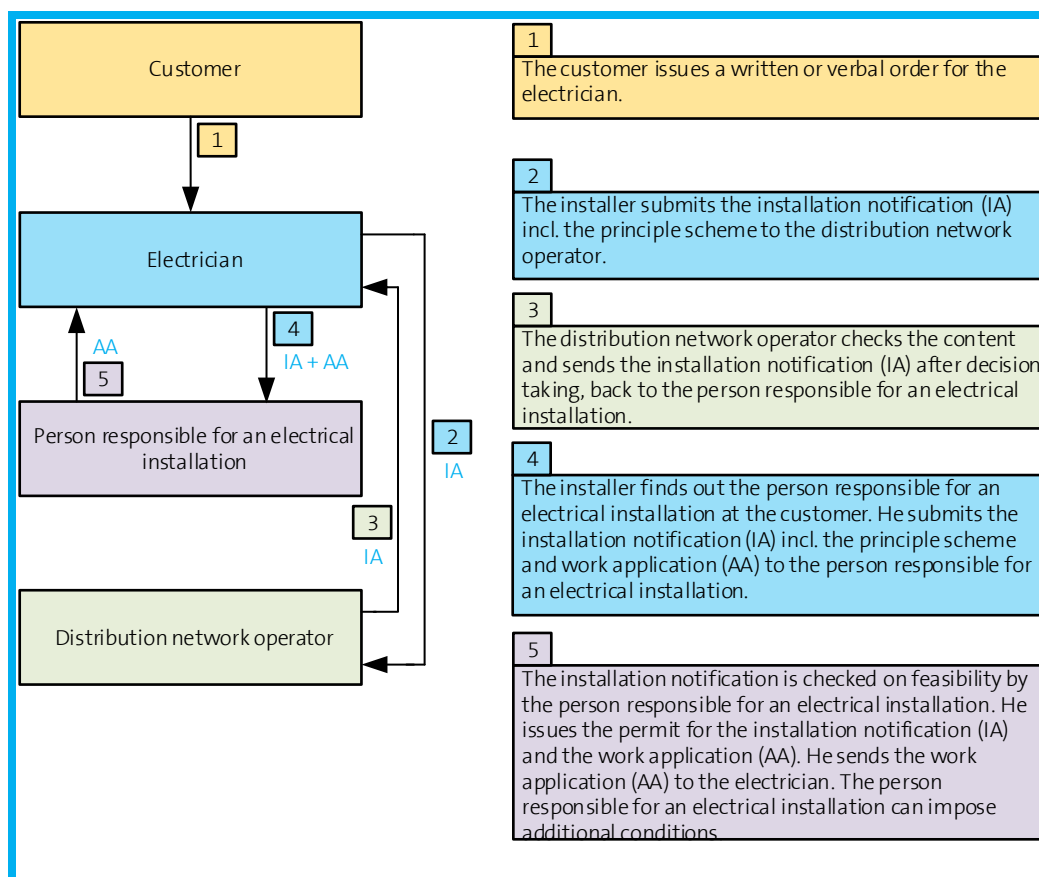


Chart A4.1.2.1.2: Distribution network operator installation notification process [6]

NOTE: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

A4.1.2.2 Safety record reporting process for new installations

A4.1.2.2.1 Swisscom AG site network operator

A4.1.2.2.1a Variant A: Acceptance inspection by customer

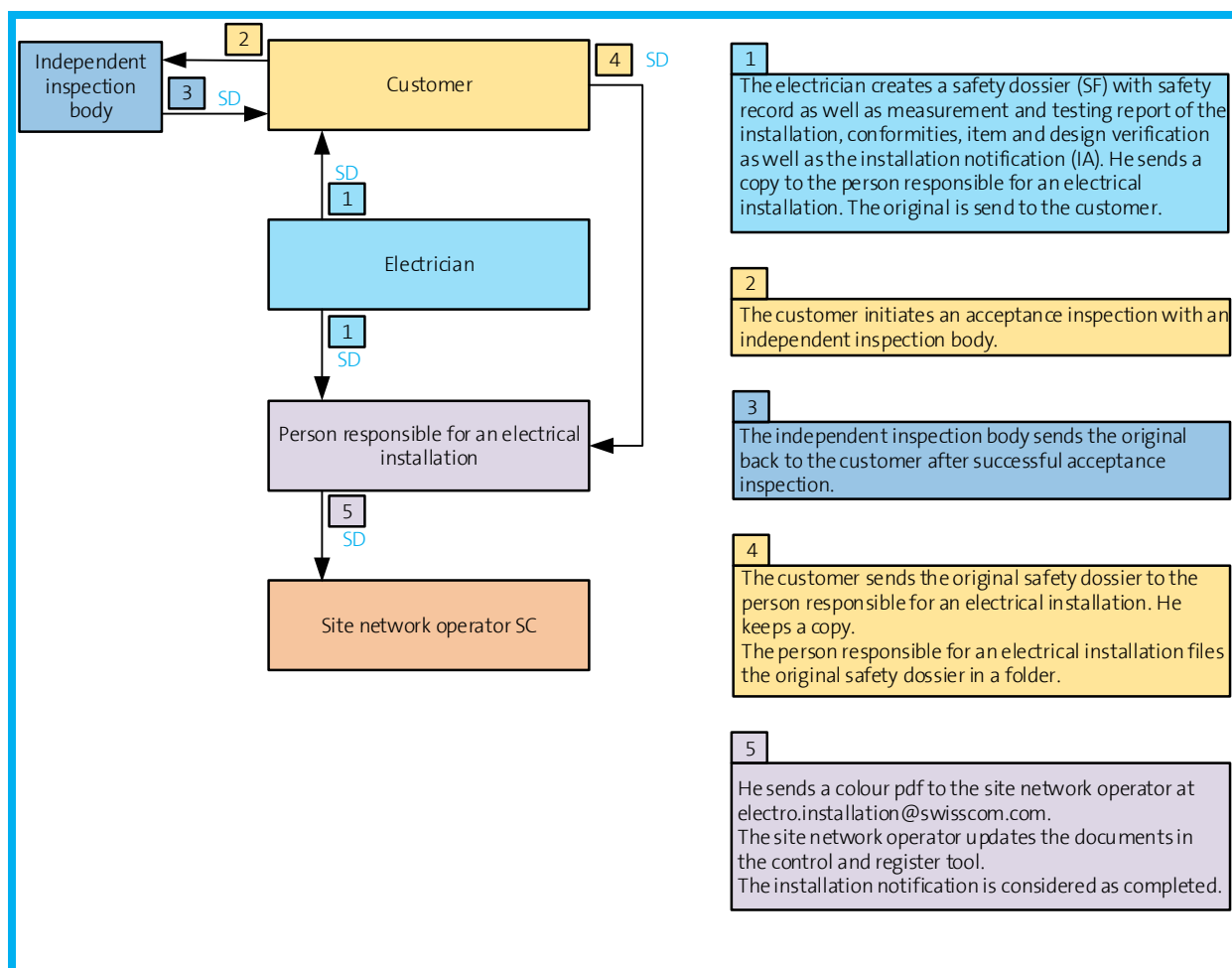


Chart A4.1.2.2.1a: Safety record process customer site network operator [6]

NOTE 1: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Site network operator SC” shown in this chart is fulfilled by the NIV central office.

A4.1.2.2.1b Variant B: Acceptance inspection by manager⁸⁹

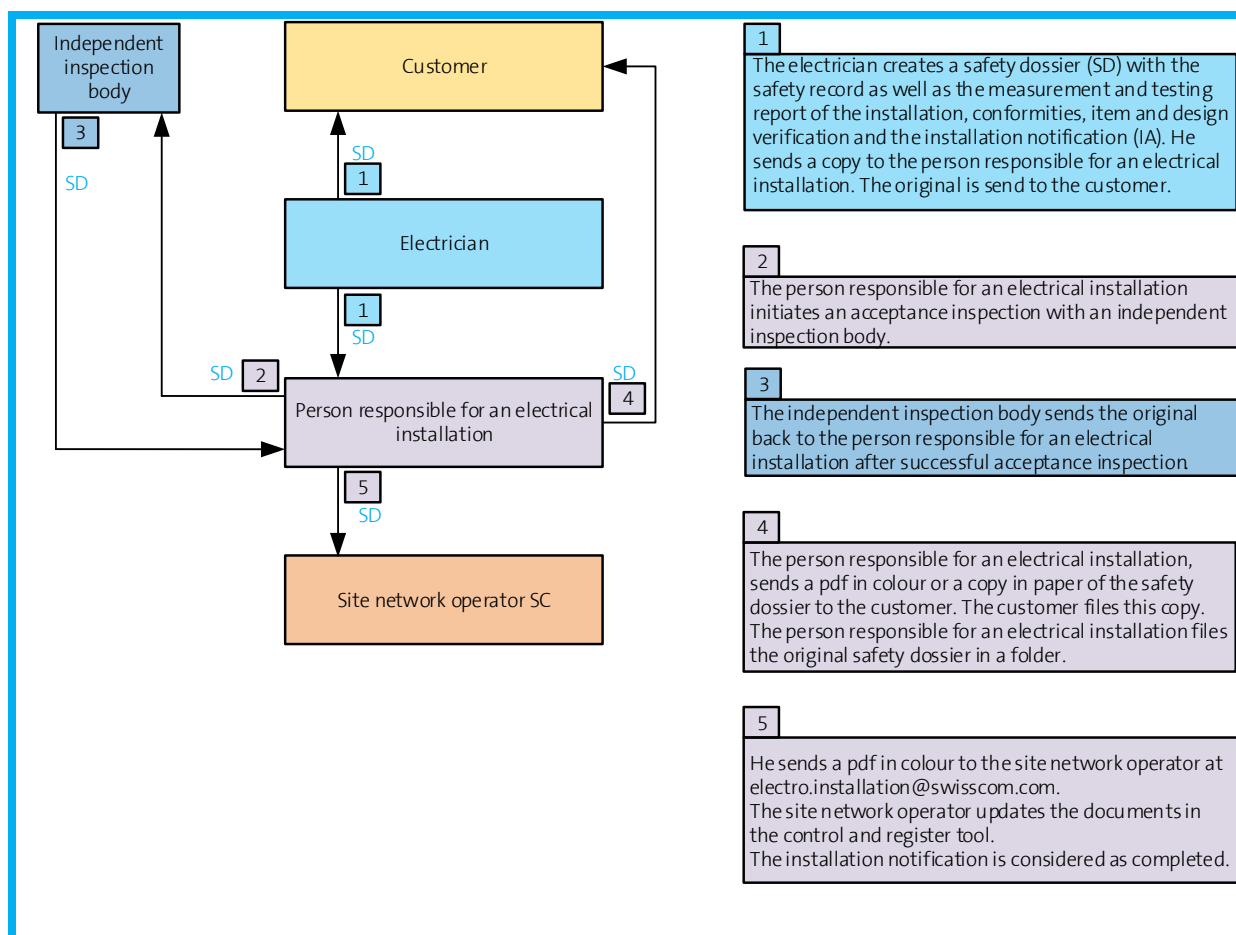


Chart A4.1.2.2.1b: Safety record process manager site network operator [6]

NOTE 1: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Proprietor SC” shown in this chart is fulfilled by the NIV central office.

⁸⁹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

A4.1.2.2.2 Distribution network operator

A4.1.2.2.2a Variant A: Acceptance inspection by customer

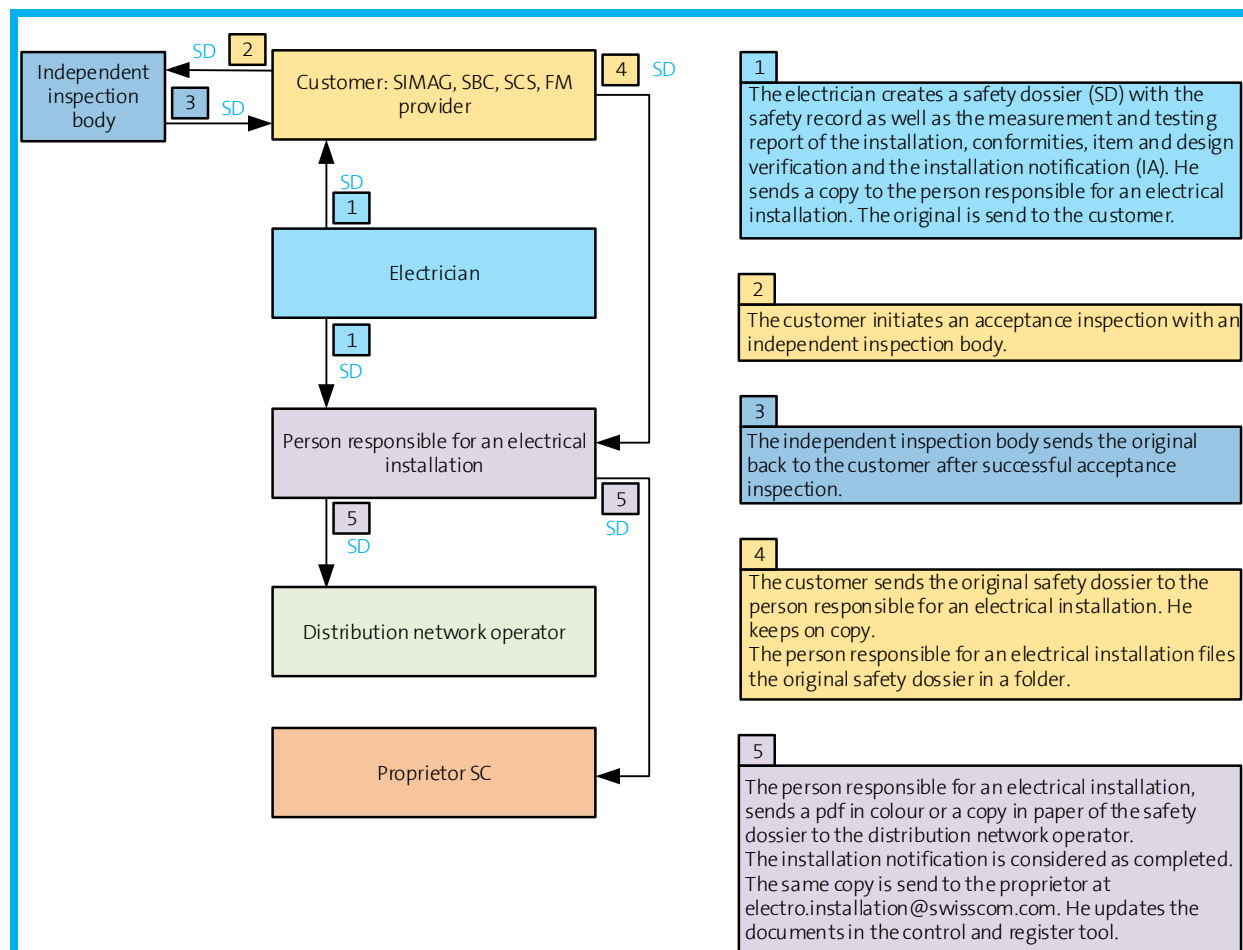


Chart A4.1.2.2.2a: Safety record process customer distribution network operator [6]

NOTE 1: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Proprietor SC” shown in this chart is fulfilled by the NIV central office.

A4.1.2.2.2b Variant B: Acceptance inspection by manager⁹⁰

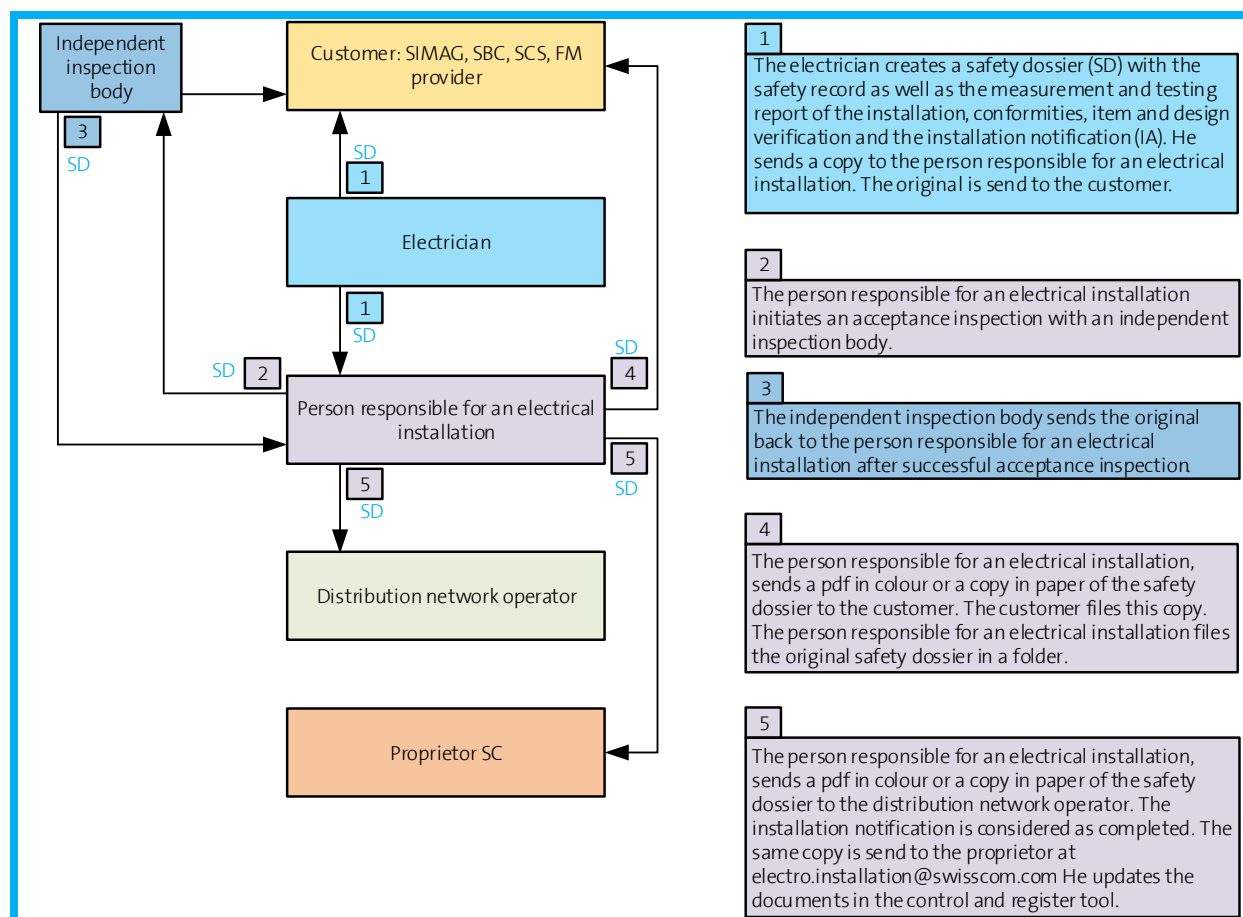


Chart A4.1.2.2.2b: Safety record process manager distribution network operator [6]

NOTE 1: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Proprietor SC” shown in this chart is fulfilled by the NIV central office.

⁹⁰ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

Safety record

Form A4.1.2.3.1: Low and extra-low voltage safety record

Form A4.1.2.3.2: Measurement and testing report low and extra-low voltage

Form A4.1.2.3.3: Measurement report low and extra-low voltage

Current specification documents: www.swisscom.ch/electro

A4.1.4 Unit verification protocol repairs and extensions to low voltage switchgear combinations

Stücknachweisprotokoll für einfache Reparaturen und Erweiterungen an Niederspannungs-Schaltgerätekombinationen
gemäß Verordnung über elektrische Niederspannungsanlagen (NEV, SR 734.35)

Auftragsgeber:
Name 1
Name 2
Strasse, Nr.
PLZ, Ort
E-Mail

Auftragsnehmer:
Name 1
Name 2
Strasse, Nr.
PLZ, Ort
Telefon

Ort der Installation: O-Nr.
Anlage
Stromkunde
Strasse, Nr.
PLZ, Ort
Koordinaten

Gebäudeart:
Zähler Nr.
Lage
Nutzung
Bauplatz

Auftrag / Ausgelagerte Arbeiten:
Foto

Verwendete Betriebsmittel:
Betriebsmittel (Hersteller, Typ, Seriennummer) Anzahl

Technische Angaben Schaltgerätekombination:
Hersteller IP-Schutz:
Typbezeichnung Schutz:
Kennnummer Kutschuss-
Produktions- möglich
Hauptstrom-
Wechsel-
Anlagen

Typ	BA	BA	BA	BA	Schutz

Stückprüfung:
☐ Einbau der Betriebsmittel gemäss Herstellerangaben
☐ Kennzeichnung der Betriebsmittel
☐ Nachführung von Schmelz, Leitungen, etc.
☐ Auswahl der Betriebsmittel gemäss
☐ Überspannungskategorie am Einbaort
☐ Erstellen des geforderten IP-Schutzgrades bei Anpassungen von Abdeckungen und dergleichen
☐ Einhaltung der geforderten Luftbreiten
☐ Leitungsführung
☐ Einstellung Schutz-, Überwachungseinrichtungen:

Messungen:
☐ Leitfähigkeit von neuen Schutzleiterverbindungen (Messstrom: ≥ 10 A, Geforderter Wert: 0,1 Ω)
☐ Betriebsfrequente Spannungsprüfung bei neuen Hauptstromkreisen > 250 A (Messspannung: ≥ 1800 VAC, Messperiode: ≥ 5 s, Geforderter Wert: Das Überstromrelais darf nicht auslösen, wenn der Ausgangsstrom ≤ 100 mA ist.)
☐ Isolationsmessung bei neuen Hauptstromkreisen ≤ 250 A und Hilfsstromkreisen (Messspannung: ≥ 500 VDC, Geforderter Wert: ≥ 1 M Ω)

Funktionserprobung:
☐ Spannungen
☐ Fehlerstrom
☐ Schutzabschaltung
☐ Verriegelungen
☐ mechanische Schalt- und Trennvorrichtung
☐ Schraubenkontrolle (mit Drehmomentkontrolle)

Rechtschleife:
☐ Richtig
☐ Falsch
☐ Nicht
☐ Nicht

Prüfer:
☐ Prüfer
☐ Datum:

Stücknachweis_SOR_Erweiterung_V1.3.0
Druckdatum: 17.12.2020 © Swisscom AG 1/1

Form A4.1.4: Unit verification protocol for simple repairs and extensions to low voltage switchgear combinations

Current specification documents: www.swisscom.ch/electro

A4.1.6.1 Installation notification reporting process for 48 V DC telecommunications installations

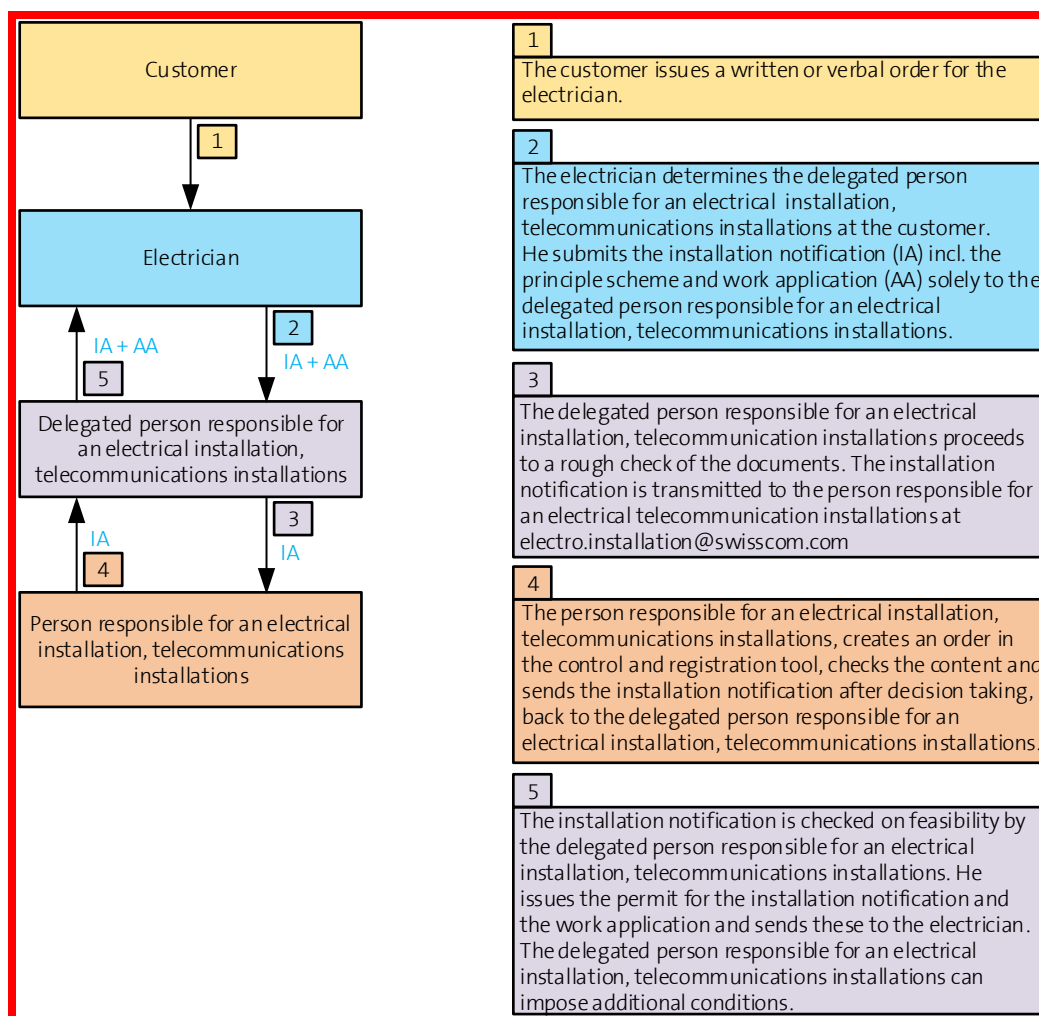


Chart A4.1.6.1: Installation notification process 48 V DC telecommunications installations

NOTE 1: Details of the delegated person responsible for an electrical installation can be found under www.swisscom.ch/electro.

A4.1.6.2 Safety record reporting process 48 V DC telecommunications installations

A4.1.6.2a Variant A: Acceptance inspection by customer

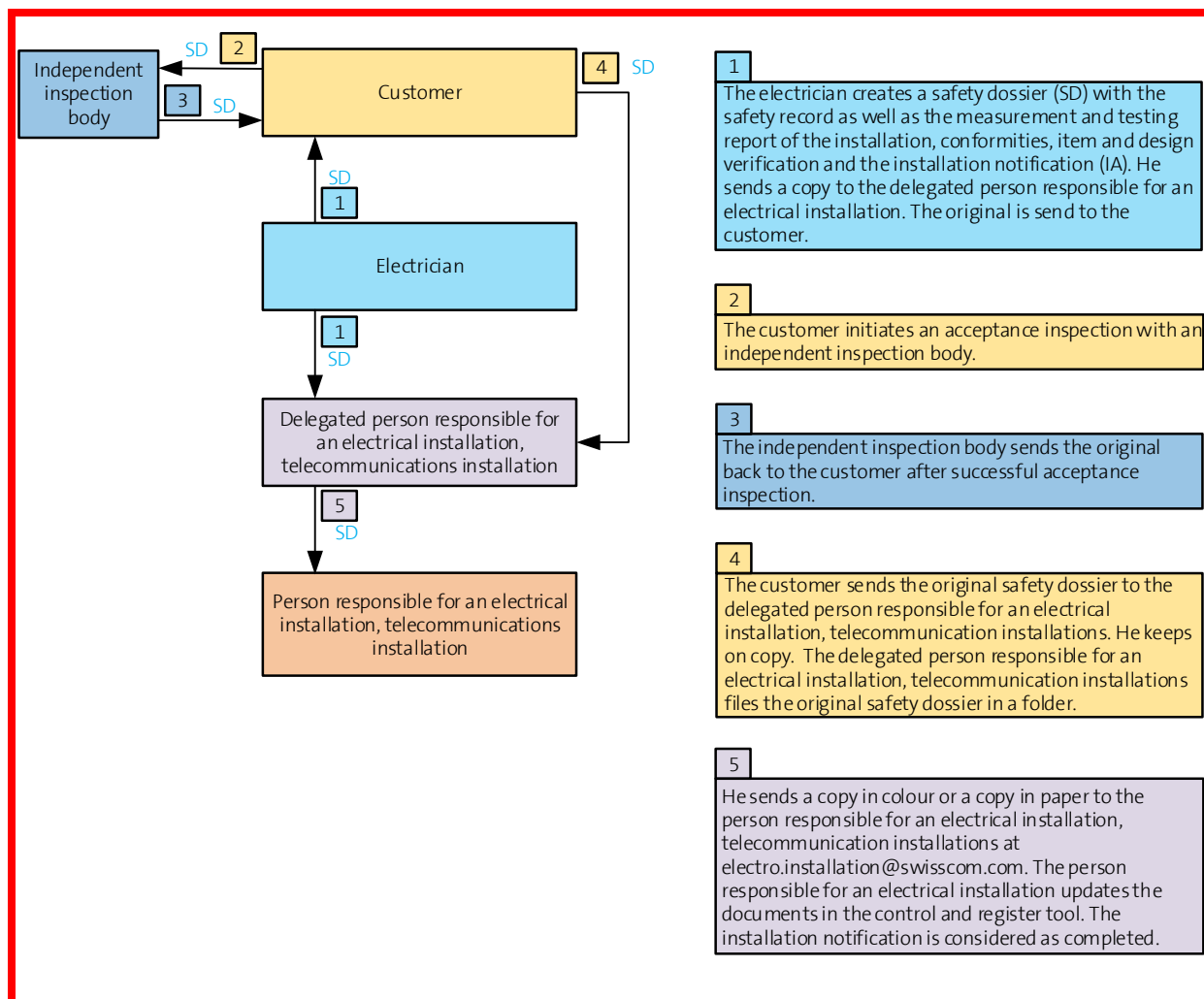


Chart A4.1.6.2a: Safety record process customer

NOTE 1: Details of the delegated person responsible for an electrical installation can be found under www.swisscom.ch/electro.

NOTE 2: In objects, of the IIP organisational unit, the function of “Person responsible for an electrical installation for telecommunications installations” shown in this chart is fulfilled by the NIV central office.

A4.1.6.2b Variant B: Acceptance inspection by person responsible for an electrical installation

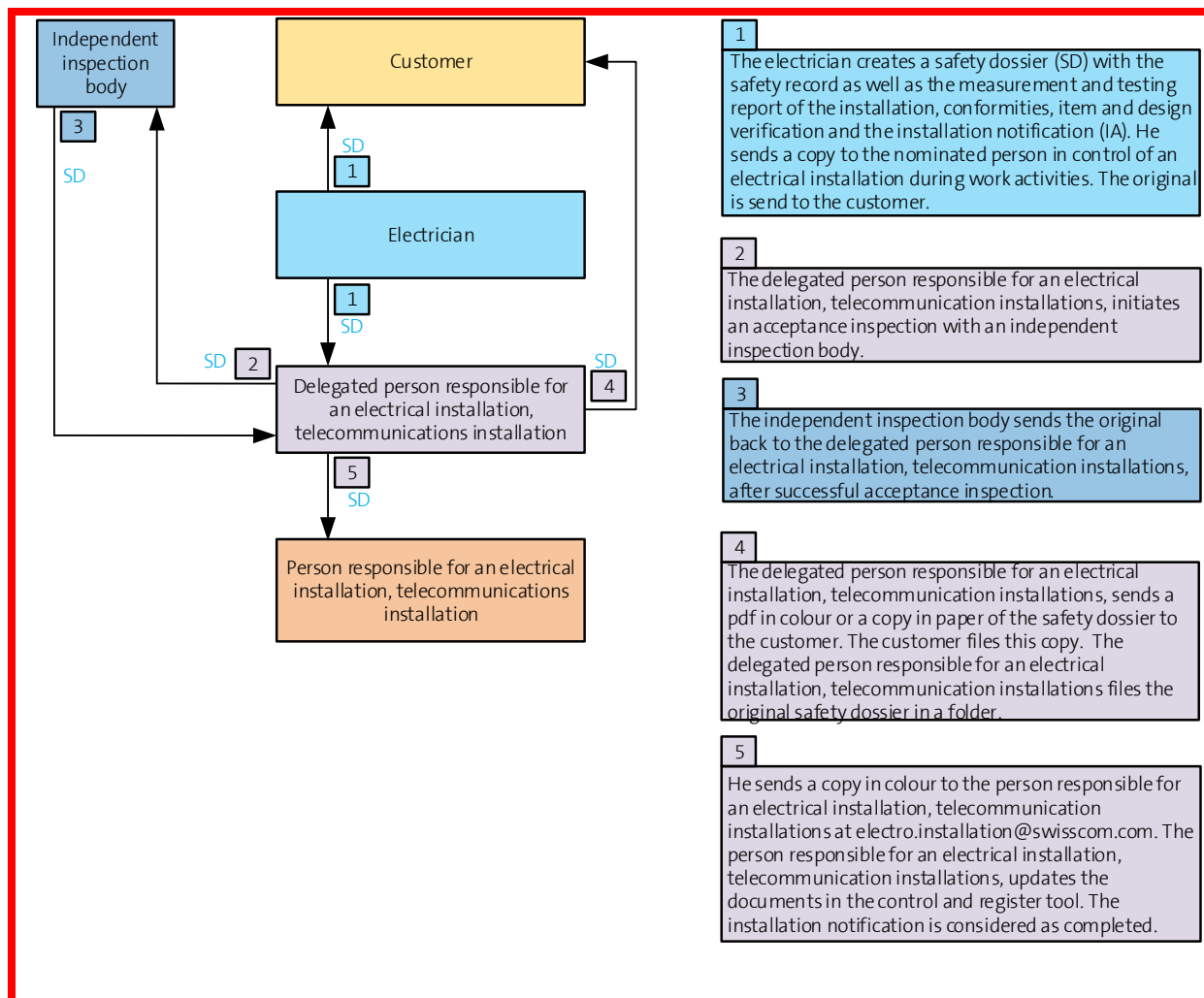


Chart A4.1.6.2b: Safety record process delegated person responsible for an electrical installation of telecommunications installations

NOTE 1: Details of the delegated person responsible for an electrical installation can be found under www.swisscom.ch/electro.

NOTE 2: In objects, of the IIP organisational unit, the function of “Person responsible for an electrical installation for telecommunications installations” shown in this chart is fulfilled by the NIV central office.

Safety record

Form A4.1.6.3.1: Safety record
48 V DC telecommunications installations

Form A4.1.6.3.2: Measurement and testing report
48 V DC telecommunications installations

Form A4.1.6.3.3: Measurement report 48 V DC telecommunications installations

Swisscom AG
Group Security
Physical Security & Safety SC
Alte Tiefenastrasse 6
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199/318

A4.2.2 Safety record reporting process existing installations

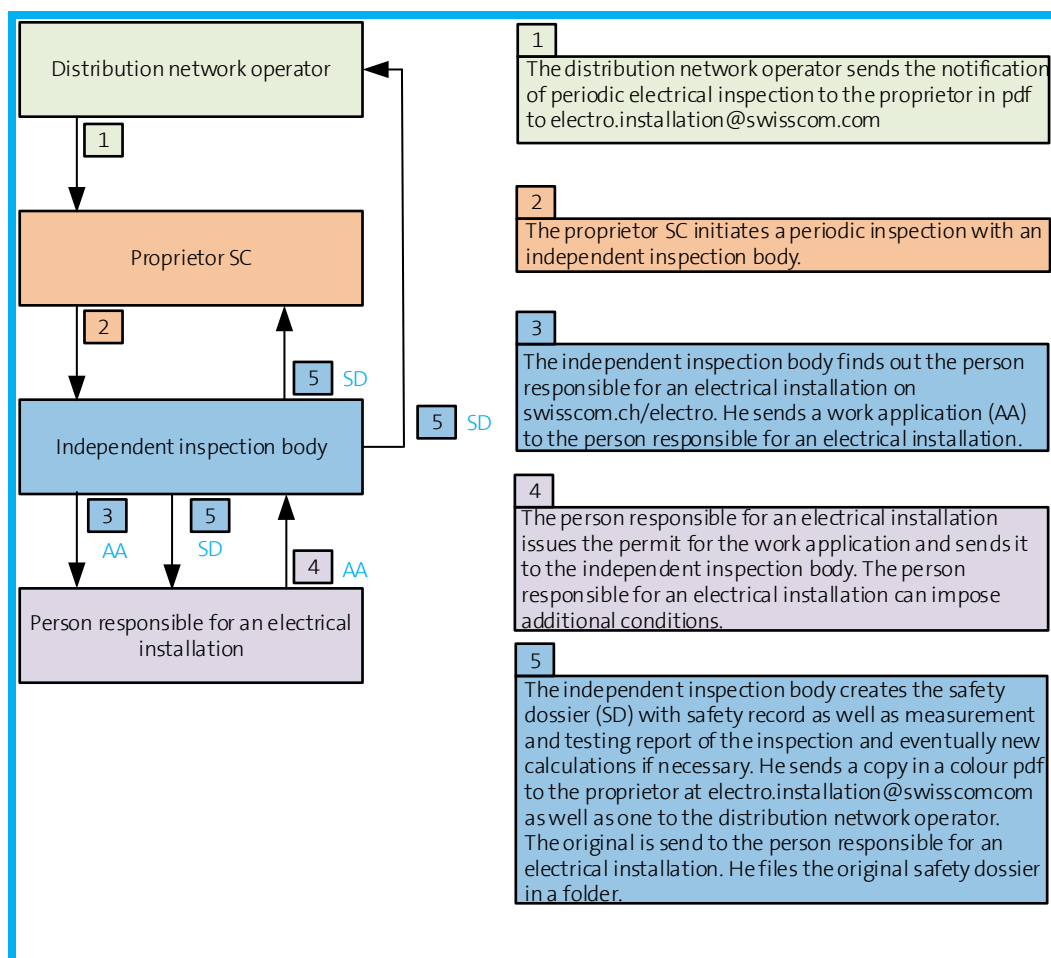


Chart A4.2.2: Safety record process periodic inspection [6]

NOTE 1: In installations as per 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the nominated person in control of an electrical installation during work activities takes on the duties of the person responsible for an electrical installation in this process.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Proprietor SC” shown in this chart is fulfilled by the NIV central office.

A4.2.4 Safety record reporting process existing telecommunications installations

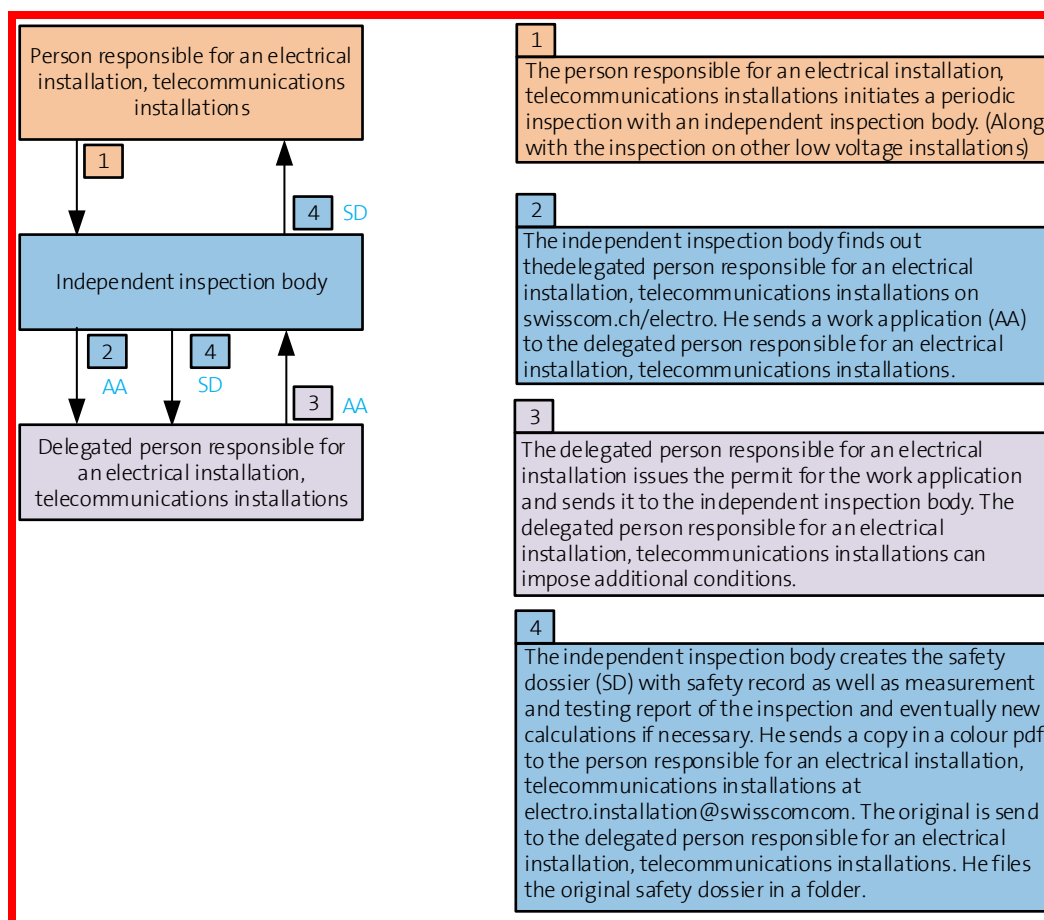


Chart A4.1.4: Safety record process periodic inspection telecommunications installations

NOTE 1: Details of the delegated person responsible for an electrical installation can be found under www.swisscom.ch/electro.

NOTE 2: In objects, of the IIP and CRE organisational unit, the function of “Person responsible for an electrical installation for telecommunications installations” shown in this chart is fulfilled by the NIV central office.

A4.3.1 Maintenance

Inspections generally take place in accordance with checklists by Swisscom AG or the FM provider. The intervals specified are minimum requirements.

Servicing is carried out by the manufacturer, the supplier or specialist companies, who must demonstrate additional specialist knowledge. It is documented using service and test reports.

Inspection or replacement of installations or of individual components is carried out in accordance with the observed system status, a lifecycle process and/or a relevant multi-year plan.

The specifications of the electrical safety concept regarding the choice of working procedures and the choice of appropriate PPE-E must always be followed when carrying out these activities.

Maintenance of transformer stations and high voltage installations

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Inspection according to checklist (A4.3.1.1a; A4.3.1.1b)		X	5 years
Inspection of preventive measures (network system)		X	5 years
High voltage circuit breaker inspection and protective equipment function check		X	As per manufacturer specifications max. 10 years
High voltage load switch function check		X	As per manufacturer specifications max. 5 years
Primary relay, secondary relay and digital relay function check		X	As per manufacturer specifications max. 5 years
Inspect primary and secondary relay		X	As per manufacturer specifications max. 10 years
Inspect transformer oil		X	10 years
Measure system earthing at foundation		X	10 years
Measure system earthing at water pipe		X	5 years

Table A4.3.1.1: Maintenance of transformer stations and high voltage installations

Maintenance of switchgear combination (low and extra-low voltage main distribution boards)

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type		
			A	B	C
Inspection as per checklist (A4.3.1.2)		X	5 Y	5 Y	10 Y
Thermochart images ⁹¹		X ⁹²	5 years ⁹³		
Inspection of residual current device / RCD (A4.3.1.6)	X	X	1 year		
Inspection of preventive measures for connected installations		X	as per Art. 36 paragraph 4 NIV		
Low voltage circuit breaker (activation)	X	X	As per manufacturer specifications		
Low voltage circuit breaker (service)		X	As per manufacturer specifications		

Table A4.3.1.2: Maintenance of low voltage main distributors

Maintenance of switchgear combinations (low and extra-low voltage substations)

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type		
			A	B	C
Inspection as per checklist (A4.3.1.3)		X	5 Y	5 Y	10 Y ⁹⁴
Thermochart images ⁹¹		X ⁹²	5 years ⁹³		
Inspection of residual current device / RCD (A4.3.1.6)	X	X	1 year		
Inspection of preventive measures for connected installations		X	as per Art. 36 paragraph 4 NIV		
Low voltage circuit breaker (activation)	X	X	As per manufacturer specifications		
Low voltage circuit breaker (service)		X	As per manufacturer specifications max. 10 years		

Table A4.3.1.3: Maintenance of switchgear combinations

⁹¹ Only used in high-availability installations, platinum and gold data centre system components and telehousing Metro, carried out along with the inspection as per NIV.

⁹² EN ISO 9712 certification level 1 required, from 2025 certification level 2

⁹³ Initial thermochart images within 6 months of commissioning with at least 30% load or during integral test. The initial thermochart imaging is the responsibility of the relevant project manager.

⁹⁴ Carried out during the periodic electrical inspection as per NIV

Maintenance of power supply installations and static UPS installations

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Inspection as per checklist (A4.3.1.4)		X	as per Manufacturer specification max. 5 years ⁹⁵
Thermochart images ⁹⁶		X ⁹⁷	5 years ⁹⁸
Replace eye rinse bottle	X	X	3 years
Service		X	As per manufacturer specifications

Table A4.3.1.4: Maintenance of power supply installations and static UPS systems

Maintenance of dynamic UPS installations and emergency power installations

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Inspection as per checklist (A4.3.1.5)		X	as per Manufacturer specification max. 5 years
Thermochart images ⁹⁶		X ⁹⁷	5 years ⁹⁸
Service		X	As per manufacturer specifications

Table A4.3.1.5: Maintenance of dynamic UPS installations and emergency power installations

Maintenance of electrical installations in machines according to EN 60204-1

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Inspection according to manufacturer checklist		X	as per Manufacturer specification max. 5 years
Thermochart images ⁹⁶		X ⁹⁷	5 years ⁹⁸
Inspection of residual current device / RCD (A4.3.1.6)	X	X	1 year
Service		X	As per manufacturer specifications

Table A4.3.1.6: Maintenance of electrical machines

⁹⁵ For microinstallations, e.g. in outdoor cabinet, only corrective maintenance is carried out. No protective maintenance is necessary

⁹⁶ Only used in high-availability installations, platinum and gold data centre system components and telehousing Metro, carried out along with the inspection as per NIV.

⁹⁷ EN ISO 9712 certification level 1 required, from 2025 certification level 2

⁹⁸ Initial thermochart images within 6 months of commissioning with at least 30% load or during integral test. The initial thermochart imaging is the responsibility of the relevant project manager.

Maintenance of electrical devices

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Visual inspection and self-testing for defective barriers, connection cables, extensions for lamps, PCs and handheld machines	X ⁹⁹	X	User before each use
Inspection after repair	X	X	Technician after each repair
Repeat testing according to SNR 462638	X	X	As per risk assessment max. 5 years

Table A4.3.1.7: Maintenance of electrical devices

Maintenance of safety installations

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Function check for emergency lighting installations		X	1 year ¹⁰⁰
Servicing of emergency lighting installations		X	As per manufacturer specifications or emergency lighting state of the art paper
Safety systems (evacuation, fire alarm, SHE, intruder alarm, SPS) function check		X	1 year or according to manufacturer specifications
Safety systems (evacuation, fire alarm, SHE, intruder alarm, SPS) maintenance		X	As per manufacturer specifications

Table A4.3.1.8: Maintenance of safety systems

Maintenance of decentralised residual current device

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Inspection of residual current device / RCD	X	X	Each working day

Table A4.3.1.9: Maintenance of decentralised residual current devices

NOTE: Decentralised residual current devices include PRCD, SRCD, RCD in local plug socket distributors (e.g. solid rubber distributors), RCD for drive conductor and RCD for service plug sockets (fire alarm, lift, gas alarm, heating, ventilation, air conditioning, sanitary, etc.). The user must inspect the RCD before use.

⁹⁹ Can also be carried out by ordinary persons (electrically)

¹⁰⁰ Observe manufacturer specifications and emergency lighting state of the art paper

Maintenance of work equipment

Inspection and execution	Instructed person	Skilled person (electrically)	Inspection period Object type
Personal protective equipment against electrical hazards		X	As per manufacturer specifications max. 2 years
Voltage detector EN 61243		X	Before each use
Universal measuring instrument		X	According to frequency of use Max. 5 years
NIV measuring instruments		X	According to frequency of use Max. 5 years

Table A4.3.1.10: Maintenance of work equipment

A4.3.1.1a Checklist for high voltage transformer stations

Business entity object: Installation: Address: Responsible party: Date:
--

1.0 General	JA	NEIN	NA
1.1 Is the transformer station easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is there visible damage to the building?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the room clean/tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Is the cable cellar dry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Is the cable drainage ok?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Are the inserted pipes sealed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Are any nearby fire stops intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Is the raised floor intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Are all the current-carrying parts of the installation covered or fitted with barriers (bars, grids, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Is the outside of the transformer station properly labelled (operating area of electrical installations as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Is access in case of emergency guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Is there a warning sign on the doors / lock cover?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Is the communication system (telephone, etc.) functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Is/are the lighting / emergency lights and sockets functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Is the escape route signposted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Is the transformer station adequately ventilated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Are all the ventilation grids secured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19 Is ingress protection (e.g. against small animals) guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20 Is the transformer station adequately protected against moisture?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21 Are an earthing kit and a voltage detector (kV) in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.22	Additional material for high voltage installation in place (e.g. turning handles for extension, cell partition walls)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23	Are “Do not switch on” signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.24	Are “Earthed and shorted” signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.25	Is a first aid information sign with emergency telephone numbers in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.26	Is the system label visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.27	Is the correct diagram and/or the correct situation plan in place on the installation and clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.28	Is the stations book in place, labelled and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.29	Are operating manuals for the equipment in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.0 High voltage switch system					JA	NEIN	NA
Name		Manufacturer		Contact protection			
Year		Type					
2.1	Are the labels in place and up-to-date?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Is the panel numbering in accordance with the diagram?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	Is the phase position / phase description correct?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Are the protective relay settings correct?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Are the protective relay settings documented?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	Are all connections in accordance with the diagram?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7	Are all the connections labelled correctly and durably?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Are there enough backup fuses in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9	Date of last circuit breaker inspection:						
2.10	Date of last load-break inspection:						
2.11	Date of last protective relay inspection:						
2.12	Particular features:						

3.0 High voltage transformer					JA	NEIN	NA
Name		Manufacturer		Current temperature			
Year		V in kVA		Maximum temperature			
3.1	Is the transformer power as specified?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Is the step switch setting ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Are the seals removed attached to the transformer?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	Is the transformer secured (transformer rails, floor)?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5	Is a sump/basin in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6	Are oil losses visible on the transformer?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7	Are the connections touch-safe?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8	Date of last oil check:						
3.9	Current load (in kVA):						
3.10	Particular features:						

4.0 Earthing system					JA	NEIN	NA
4.1	Is an earthing concept (principle scheme) in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	Is the earthing busbar ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3	Is the transformer station double earthed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4	Are the earthing system labels ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5	Is the special earthing ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.6	Is an earthing protocol in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.7	Are the earthing values observed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8	Are the earthing measurements entered in the stations book?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.9	Are all screws tightened?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10	Is the switch system earthed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.11	Are the transformer (incl. cover) and tray earthed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.12	Is the PEN conductor earthed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.13	Does the system earthing include the frames, grids, etc.?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.14 Where is the PEN conductor earthed:	
4.15 Date of last earthing measurement:	

Table A4.3.1.1a: Checklist for high voltage transformer stations

Implementing technician: First name, last name (in block capitals)	Stamp (Company name) and Signature:
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Comment/defects:

A4.3.1.1b Checklist for high voltage installations

Business entity object: Installation: Address: Responsible party: Date:
--

1.0 General	JA	NEIN	NA
1.1 Is the high voltage installation easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is there visible damage to the building?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the room clean/tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Is the cable cellar dry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Is the cable drainage ok?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Are the inserted pipes sealed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Are any nearby fire stops intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Is the raised floor intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Are all the current-carrying parts of the installation covered or fitted with barriers (bars, grids, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Is the outside of the high voltage installation properly labelled (operating area of electrical installations as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Is access in case of emergency guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Is there a warning sign on the doors / lock cover?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Is the communication system (telephone, etc.) functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Is/are the lighting / emergency lights and sockets functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Is the escape route signposted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Is the high voltage installation adequately ventilated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Are all the ventilation grids secured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19 Is ingress protection (e.g. against small animals) guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20 Is the high voltage installation adequately protected against moisture?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21 Are an earthing kit and a voltage detector (kV) in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.22	Additional material for high voltage installation in place (e.g. turning handles for extension, cell partition walls)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23	Are “Do not switch on” signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.24	Are “Earthed and shorted” signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.25	Is a first aid information sign with emergency telephone numbers in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.26	Is the system label visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.27	Is the correct diagram and/or the correct situation plan in place on the installation and clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.28	Is the stations book in place, labelled and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.29	Are operating manuals for the equipment in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.0 High voltage switch system					JA	NEIN	NA
Name		Manufacturer		Contact protection			
Year		Type					
2.1	Are the labels in place and up-to-date?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Is the panel numbering in accordance with the diagram?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	Is the phase position / phase description correct?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Are the protective relay settings correct?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Are the protective relay settings documented?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	Are all connections in accordance with the diagram?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7	Are all the connections labelled correctly and durably?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Are there enough backup fuses in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9	Date of last circuit breaker inspection:						
2.10	Date of last load-break inspection:						
2.11	Date of last protective relay inspection:						
2.12	Particular features:						

3.0 Earthing system					JA	NEIN	NA
3.1	Is an earthing concept (principle scheme) in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Is the earthing busbar ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3 Is the transformer station double earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4 Are the earthing system labels ok?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5 Is the special earthing ok?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6 Is an earthing protocol in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 Are the earthing values observed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8 Are the earthing measurements entered in the stations book?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9 Are all screws tightened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.10 Is the switch system earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.11 Are the transformer (incl. cover) and tray earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.12 Is the PEN conductor earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.13 Does the system earthing include the frames, grids, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.14 Where is the PEN conductor earthed:			
3.15 Date of last earthing measurement:			

Table A4.3.1.1b: Checklist for high voltage installations

Implementing technician: First name, last name (in block capitals)	Stamp (Company name) and Signature:
Comment/defects:	

A4.3.1.1c Checklist for low voltage transformer stations
Business entity
object:
Installation:
Address:
Responsible party:
Date:

1.0 General	JA	NEIN	NA
1.1 Is the transformer station easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is there visible damage to the building?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the room clean/tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Is the cable cellar dry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Is the cable drainage ok?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Are the inserted pipes sealed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Are any nearby fire stops intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Is the raised floor intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Are all the current-carrying parts of the installation covered or fitted with barriers (bars, grids, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Is the outside of the transformer station properly labelled (electrical operating room as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Is access in case of emergency guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Is there a warning sign on the doors / lock cover?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Is the communication system (telephone, etc.) functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Is/are the lighting / emergency lights and sockets functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Is the escape route signposted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Is the transformer station adequately ventilated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Are all the ventilation grids secured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19 Is ingress protection (e.g. against small animals) guaranteed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20 Is the transformer station adequately protected against moisture?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21 Are an earthing kit and a voltage detector in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.22	Are "Do not switch on" signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23	Are "Earthed and shorted" signs in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.24	Is a first aid information sign with emergency telephone numbers in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.25	Is the system label visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.26	Is the correct diagram and/or the correct situation plan in place on the installation and clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.27	Is the stations book in place, labelled and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.28	Are operating manuals for the equipment in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.0 Low voltage transformer					JA	NEIN	NA
Name		Manufacturer		Current temperature			
Year		V in kVA		Maximum temperature			
2.1	Is the transformer power as specified?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Is the step switch setting ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	Are the seals removed attached to the transformer?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Is the transformer secured (transformer rails, floor)?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Is a sump/basin in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	Are oil losses visible on the transformer?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7	Are the connections touch-safe?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	Date of last oil check:						
2.9	Current load (in kVA):						
2.10	Particular features:						

3.0 Earthing system					JA	NEIN	NA
3.1	Is an earthing concept (principle scheme) in place?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Is the earthing busbar ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Is the transformer station double earthed?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	Are the earthing system labels ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5	Is the special earthing ok?				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.6 Is an earthing protocol in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 Are the earthing values observed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8 Are the earthing measurements entered in the stations book?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9 Are all screws tightened?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.10 Is the switch system earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.11 Are the transformer (incl. cover) and tray earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.12 Is the PEN conductor earthed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.13 Does the system earthing include the frames, grids, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.14 Where is the PEN conductor earthed:			
3.15 Date of last earthing measurement:			

Table A4.3.1.1c: Checklist for low voltage transformer stations

**Implementing
technician:**

First name, last
name (in block
capitals)

Stamp

(Company
name)
and

Signature:

Comment/defects:

A4.3.1.2 Checklist for switchgear combination (low and extra-low voltage main distribution boards)
Business entity
object:
Installation:
Address:
Responsible party:
Date:

1.0 Low and extra-low voltage main distribution board	JA	NEIN	NA
1.1 Is the installation easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is a warning sign attached to the door (electrical operating room as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Are the panels easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Are the system labels visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Is the communication system (telephone, etc.) functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Is/are the lighting and sockets working?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Are the panels clean and tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Are the panels in good structural condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Odour-neutral environment (e.g. no traces of burning)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Noise-neutral environment (e.g. no excessive humming noises)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Is there a second barrier with warning signs at the panel supply (feed line)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Are the right diagrams and keys in place on/in the individual panels and are they clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Are all connections in accordance with the diagram?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Are all the connections labelled correctly and durably?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Do the fuses used match the label/diagram ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Are there enough spare fuses in place (Diazed/NHS)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Are all the current-carrying parts covered (IP2XC)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19 Is the installation adequately protected against moisture, dust and heat (internal or external) ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20 Is there adequate ventilation (natural or forced)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21 Are the entries from above properly covered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.22 Are the protective conductor and protective equipotential bonding conductor intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23 Is the network system properly implemented (TN-S/TN-C)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.24 Have all the safety requirements been observed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.25 Is a first aid information sign with emergency telephone numbers in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.26 Are the settings for the protective devices correct and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.27 Are any nearby fire stops intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.28 Data point connections to GLS (building management system) checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table A4.3.1.2: Checklist for switchgear combination (low and extra-low voltage main distribution boards)

**Implementing
technician:**

First name, last
name (in block
capitals)

Stamp

(Company
name)
and

Signature:

Comment/defects:

A4.3.1.3 Checklist for switchgear combination (low and extra-low voltage substations)
Business entity
object:
Installation:
Address:
Responsible party:
Date:

1.0 Substation	JA	NEIN	NA
1.1 Is the switchgear combination (SGK) easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the system label visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Is the switchgear combination clean and tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Is the switchgear combination in good structural condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Odour-neutral environment (overheating, short circuit, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Noise-neutral environment (e.g. no excessive humming noises)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Is there a second barrier with warning signs at the switchgear supply (feed line)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Are the lighting and the socket(s) in the switchgear combination functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Are the right diagrams and a key in place and clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Are all connections in accordance with the diagram?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Are all the connections labelled correctly and durably?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Do the fuses used match the label/diagram?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Are there enough spare fuses in place (Diazed/NHS)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Are all the current-carrying parts covered (IP2XC)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Is the switchgear combination adequately protected against moisture, dust and heat (internal or external)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Is there adequate ventilation (natural or forced)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Are entries from above properly covered?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.19 Are the ground conductor and protective potential equalization conductor intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20 Is the network system properly implemented (TN-S/TN-C)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21 Have all the safety requirements been observed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.22	Are the settings for the protective devices correct and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23	Are any nearby fire stops intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.24	Data point connection to GLS (building management system) checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table A4.3.1.3: Checklist for switchgear combination (low and extra-low voltage substations)

**Implementing
technician:**

First name, last
name (in block
capitals)

Stamp

(Company
name)
and

Signature:

Comment/defects:

A4.3.1.4 Checklist for power supply installations and static UPS installations
Business entity
object:
Installation:
Address:
Responsible party:
Date:

The installation must be inspected in accordance with the manufacturer's operating guidelines and/or checklists where necessary!

1.0 Power supply systems and static UPS system	JA	NEIN	NA
1.1 Is a warning sign attached to the door (electrical operating room as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Are the UPS installations easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Are the primary and secondary distribution boards easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Are the UPS system labels visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Are the UPS installations clean and tidy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Are the UPS installations in good structural condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Odour-neutral environment (e.g. no traces of burning)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Is there a second barrier with warning signs at the supply (feed line)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Are the right diagrams and keys in place on/in the individual UPS installations and are they clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Uninterruptible power supply installation display inspection: Are the load symmetry, power, current, voltage and autonomy time in the normal range and are there no faults/warnings present?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 UPS system ventilators operating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Room climate checked (room temperature/humidity)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Is a first aid information sign with emergency telephone numbers in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Is the system operated and maintained in accordance with the manufacturer specifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Are the settings for the protective devices correct and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Data point connection to GLS (building management system) checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table A4.3.1.4: Checklist for power supply systems and static UPS installations

**Implementing
technician:**

First name, last
name (in block
capitals)

Stamp

(Company
name)
and

Signature:

Comment/defects:

A4.3.1.5 Checklist for dynamic UPS installations and emergency power systems
Business entity
object:
Installation:
Address:
Responsible
party:
Date:

The installation must be inspected in accordance with the manufacturer's operating guidelines and/or checklists where necessary!

1.0 Dynamic UPS system and emergency power system	JA	NEIN	NA
1.1 Is a warning sign attached to the door (electrical operating room as per Electrical Safety Concept)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Is the emergency power plant easily accessible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Are protective ear plugs available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Is the locking system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Is the system label visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7 Is/are the lighting and sockets working?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8 Is the correct diagram and/or the correct situation plan in place on the installation and clearly legible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9 Power unit checked for dirt, damage, corrosion and proper attachment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10 Is the starter motor system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11 Cooling system checked externally for damage, corrosion and watertightness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12 Cooling system checked for protection against frost and corrosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13 Oil storage tank and retention system (e.g. collection tray) checked externally for dirt, damage, corrosion and watertightness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14 Fuel supply system lines and connections checked for corrosion, proper attachment and watertightness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.15 Fuel supply system switching and shutoff valves checked for function and watertightness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.16 Function of fill-level display device on storage tank checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.17 Function of limit value transmitter checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.18 Function of fuel supply system leakage warning system checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1.19	Generator checked for dirt, damage, corrosion and proper attachment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.20	Safety and shutoff criteria checked (e.g. oil, engine speed, coolant)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.21	Is the room ventilation system functioning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.22	Are the settings for the protective devices correct and documented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.23	Data point connection to GLS (building management system) checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table A4.3.1.5: Checklist for dynamic UPS systems and emergency power installations

**Implementing
technician:**

First name, last
name (in block
capitals)

Stamp

(Company
name)
and

Signature:

Comment/defects:



APPENDICES

AUTHORISATIONS

RULES

Implementing technician:

Stamp

(Company name)

and

Signature:

Swisscom AG

B Authorisation, duties, competence and responsibility

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Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.1 Proprietor

The proprietor is the responsible operator of the Swisscom AG electrical installation [3]. He has overall responsibility for the safe operation of the electrical installation. He also defines the safety principles, rules and conditions of the organisation.

B3.2.1a Proprietor

B3.2.1b Delegated proprietor in an organisational unit

B3.2.1c Delegated proprietor for an object / object group

Requirements

- Does not have any special electrical training.
- For technical matters he is advised and supported by the electrical safety officer.
- For technical matters the delegated proprietor, if any, is supported by the electro agents.
- Knows the operational procedures.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within five years
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR/AED.</i>	When taking up the post and repeated within three years
2.7.7c Work safety	<i>Optional:</i> <i>Access</i>	On first scheduled access and repeated within two years
2.7.7d Order process	Issuing of the order; Monitoring and auditing of work locations. <i>Optional:</i> <i>Electrical safety;</i> <i>Supporting outside personnel;</i> <i>Documentation (safety record, conformity).</i>	When taking up the post and repeated within five years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.1	When taking up the post and repeated within two years

Table B3.2.1: Proprietor requirements

Duties

- Checks whether the duties delegated to the person responsible for an electrical installation have been completed as defined by the proprietor. The following points must be checked:
 - Order process;
 - Access;
 - Training;
 - Electrical safety record;
 - Maintenance;
 - Energy management;
 - Cyber security;
 - ESD protection.
- Appoints an electrical safety officer. The delegated proprietors appoint the electro agent in their organisational unit.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Authorisations

- Can approve resources (finance, personnel, etc.) for danger and defect elimination within his area of competence, and/or demand them if they are beyond his area of competence.
- Can declare sanctions as per section 5.4 and impose them accordingly.
- Can initiate emergency shut-off of electrical installations as per R2.5.3.2.1 regulations.
- Generally has the right to audit person responsible for an electrical installation at any time without notice, to check the training and experience of employees of third party companies carrying out work on electrical installations for which Swisscom AG is the proprietor, and to demand that the relevant basic requirements are met.

Other authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.2 electrical safety officer

The Swisscom AG electrical safety officer and the Swisscom Broadcast AG electrical safety officer supports the respective proprietor in all technical matters. He also defines the safety principles, rules and conditions of the organisation on behalf of the proprietor.

The electrical safety officer of the FM provider supports the person responsible for an electrical installation of the FM provider in all technical matters.

The electrical safety officers proactively discuss the state of the art, audits and dealings with authorities.

- B3.2.2a Swisscom AG electrical safety officer
- B3.2.2b Swisscom Broadcast AG electrical safety officer
- B3.2.2c FM provider electrical safety officer

Requirements

- Is a skilled person with expert status as per Art. 8 NIV or equivalent qualification.
- Knows the operational procedures.
- Is highly competent, has good communication and social skills and can communicate appropriately with both managers and colleagues.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary
2.7.7b First aid for electrical and electrolyte accidents	First aid (BLS); CPR / AED; Rescuing patients in electrical installations; Rescuing patients in battery installations.	When taking up the post and repeated within three years
2.7.7c Work safety	Conduct during an incident; Preventing measures Access.	When taking up the post and repeated within two years
2.7.7d Order process	Issuing of the order; Monitoring and auditing of work locations; Electrical safety; Supporting outside personnel; Documentation (safety record, conformity).	When taking up the post and repeated within two years

Activity	Scope	Frequency
2.7.7e Authorisation, duties, competence and responsibility	B3.2.2	When taking up the post and repeated within two years
2.7.7f Live working	Working procedures s; Personal protective equipment against electrical hazards.	When taking up the post and repeated within two years

Table B3.2.2: Requirements for electrical safety officer

Duties

- Ensure that the Electrical Safety Concept, the basic safety principles therein and the regulations are defined, kept up-to-date, communicated widely and observed.
- Auditing of proprietors, person responsible for an electrical installation and the objects they maintain. The following points must be checked:
 - Order process;
 - Access;
 - Training;
 - Electrical safety record;
 - Maintenance;
 - Energy management;
 - Cyber security;
 - ESD protection.
- Appropriately communicates relevant changes to the specification documents, technical rules and ordinances, as well as audit events and outcomes.
 - Primarily to the individual proprietors and person responsible for an electrical installation of the relevant organisational units, or to their electro agents or skilled region managers, if any.
 - Communication to the skilled manager is carried out by the electrical safety officer of the FM provider.
- Notifies the management board in case of important events and findings that fall within the scope of this Electrical Safety Concept.
- Compiles an annual report for the attention of the proprietor.
- Is responsible for stipulating special provisions and regulations for extraordinary risk installations.
- Is the main point of contact for authorities (e.g. BFE, ESTI) and organisations (e.g. Electrosuisse) for installations within the scope of this Electrical Safety Concept.
- Leads inquiries into accidents (incidents involving people or significant material damage) in collaboration with the authorities.
- The Swisscom AG electrical safety officer assists the Swisscom AG proprietors and persons responsible for an electrical installation in all technical matters.
- The Swisscom Broadcast AG electrical safety officer assists the Swisscom Broadcast AG proprietors and person responsible for an electrical installation in all technical matters.
- Is responsible for training of proprietors, persons responsible for an electrical installation and employees with restricted installation permits.
- Decision-maker for all safety-relevant matters, energy supply faults and the like.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Authorisations

- Can approve resources (finance, personnel, etc.) for danger and defect elimination within his area of competence, and/or demand them if they are beyond his area of competence.
- Can declare sanctions as per section 5.4 and impose them accordingly.
- Can initiate emergency shut-off of electrical installations as per R2.5.3.2.1 regulations.
- Generally has the right to audit proprietors, persons responsible for an electrical installation, nominated person in control of an electrical installation during work activities, nominated person in control of a work activity, contracting partners and objects at any time without notice, to check the training and experience of employees of third party companies carrying out work on electrical installations for which Swisscom AG is the proprietor, and to demand that the relevant basic requirements are met.

Other authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.3 Electro agent

The electro agent supports the delegated proprietor and the delegated person responsible for an electrical installation in all technical matters. He also defines the safety principles, rules and conditions of the organisation on behalf of the electrical safety officer.

Requirements

- Is a skilled person (electrically).
- Knows the operational procedures.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary
2.7.7b First aid for electrical and electrolyte accidents	First aid (BLS); CPR / AED; Rescuing patients in electrical installations; Rescuing patients in battery installations.	When taking up the post and repeated within three years
2.7.7c Work safety	Conduct during an incident; Preventing measures; Access.	When taking up the post and repeated within two years
2.7.7d Order process	Issuing of the order; Monitoring and auditing of work locations; Electrical safety; Supporting outside personnel; Documentation (safety record, conformity).	When taking up the post and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.3	When taking up the post and repeated within two years
2.7.7f Live working	Working procedures s; Personal protective equipment for protection against electrical hazards.	When taking up the post and repeated within two years

Table B3.2.3: Electro agent requirements

Duties

- Ensure that the Electrical Safety Concept, the basic safety principles therein and the regulations are communicated widely and observed in his organisational unit.
- Auditing of proprietors, the person responsible for an electrical installation and the objects they maintain in consultation with the electrical safety officer. The following points must be checked:
 - Order process;
 - Access;
 - Training;
 - Electrical safety record;
 - Maintenance;
 - Energy management;
 - Cyber security;
 - ESD protection.
- Appropriately communicates relevant changes to the specification documents, technical rules and ordinances, as well as audit events and outcomes.
 - Primarily to the delegated proprietors and delegated persons responsible for an electrical installation of his organisational unit.
- The electro agent assists the Swisscom AG delegated proprietors and delegated persons responsible for an electrical installation in all technical matters.
- Joint decision-maker for all safety-relevant matters, energy supply faults and the like within his organisational unit.
- Specialist responsibility for Swisscom AG employees in their organisational unit with an installation work permit Art. 13 NIV, Art. 14 NIV and Art. 15 NIV. Coordination of training and checking by an accredited inspection body of these authorisation holders.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Authorisations

- Can approve resources (finance, personnel, etc.) for danger and defect elimination within his area of competence, and/or demand them if they are beyond his area of competence.
- Can declare sanctions as per section 5.4 and impose them accordingly.
- Can initiate emergency shut-off of electrical installations used by his organisational unit as per R2.5.3.2.1 regulations.
- Generally has the right, at any time and without notice, to check the training and experience of employees of third party companies carrying out work on electrical installations for which Swisscom AG is the proprietor, and to demand that the relevant basic requirements are met.

Other authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.4 Person responsible for an electrical installation

The person responsible for an electrical installation has overall responsibility, on behalf of the proprietor, for the safe operation of the electrical installation. He also defines the safety principles, rules and conditions of the organisation on behalf of the proprietor.

- B3.2.4a Person responsible for an electrical installation of a high voltage distribution network
- B3.2.4b Person responsible for an electrical installation of a high voltage site network
- B3.2.4c Person responsible for an electrical installation of low and extra-low voltage infrastructure installations
- B3.2.4d Person responsible for an electrical installation of low and extra-low voltage telecommunications installations
- B3.2.4e Delegated person responsible for an electrical installation of low and extra-low voltage infrastructure installations in the organisational unit
- B3.2.4f Delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations in the organisational unit
- B3.2.4g Delegated person responsible for an electrical installation of a high voltage site network for an object / object group
- B3.2.4h Delegated person responsible for an electrical installation of low and extra-low voltage infrastructure installations for an object / object group
- B3.2.4i Delegated person responsible for an electrical installation of low and extra-low voltage telecommunications installations for an object / object group

Requirements

- Does not have any special electrical training.
 - If there is no electro agent or regions manager with expertise in the organisational unit, the person responsible for an electrical installation must be a skilled person.
- For technical matters he is supported by the electrical safety officer of the contracting partner (as per section 2.1 Swisscom does not have any employees in the role of person responsible for an electrical installation, only delegated persons responsible for an electrical installation).
- For technical matters the delegated person responsible for an electrical installation are supported by the electro agent or skilled region manager.
- Knows the operational procedures.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within five years
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR/AED.</i>	When taking up the post and repeated within three years

Activity	Scope	Frequency
2.7.7c Work safety	<i>Optional: Access</i>	On first scheduled access and repeated within two years
2.7.7d Order process	Issuing of the order; Monitoring and auditing of work locations; <i>Optional: Electrical safety; Supporting outside personnel; Documentation (safety record, conformity).</i>	When taking up the post and repeated within five years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.4	When taking up the post and repeated within two years
2.7.7f Live working	<i>Optional¹⁰²: Working procedures; Personal protective equipment against electrical hazards.</i>	When taking up the post and repeated within two years

Table B3.2.4: Requirements of persons responsible for an electrical installation

Technical duties

- Object-specific instruction of fire service with regards to objects with high voltage installations and energy generation plants [8].
 - In case of an incident, action must be coordinated closely with the public fire service. In order to enable this coordination, selected representatives of the local fire service will be instructed on the specific operational hazards.

The local fire service will be informed of the following by the person responsible for an electrical installation:

- Particular hazards;
- Fire safety concept;
- Procedure for cutting off supply of electricity in case of emergency;
- Patient rescue and emergency aid in case of electrical accidents.

In case of intended, structural changes and in particular in case of changes or extensions to the power supply or similar, instruction must be carried out with the fire service (including e.g. plant tour, inspecting fire service plans, emergency simulation exercise, etc.) [8]. This instruction should take place at least every three years [8].

- For installations with building supply at network level 5 the person responsible for an electrical installation maintains the inspection file for high and low voltage installations.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

¹⁰² Only necessary if there is no electro agent or regions manager with expertise in the organisational unit

Administrative and quality assurance duties

- Is responsible for the implementation and observance of the safety principles and rules of this Electrical Safety Concept. This includes in particular:
 - Order process;
 - Access;
 - Training;
 - Electrical safety record;
 - Maintenance
 - Energy management;
 - Cyber security;
 - ESD protection.

The following duties must also be performed by the person responsible for an electrical installation:

- Planning of measures and documentation of system security as per section 4:
 - Ensuring that for all work, he receives the necessary documents, such as conformity declarations, safety records, measurement reports, plans, diagrams, keys, etc., and that these are stored with the installation if necessary;
 - Organises and coordinates acceptance and spot check inspections as per NIV;
 - Archives the original copy of the safety record and provides the NIV central office with a copy.
- In case of operational faults, informs the delegated proprietor in writing within one working day of the action and its outcome and consequences.

In installations as per section 2.1.1.1, in which employees of the FM provider act as the nominated person in control of an electrical installation during work activities, the administrative and quality assurance duties will be delegated to the nominated person in control of an electrical installation during work activities.

- The delegated person responsible for an electrical installation checks whether the administrative and quality assurance duties delegated to the nominated person in control of an electrical installation during work activities have been completed as defined by the person responsible for an electrical installation.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Authorisations

- Can approve resources (finance, personnel, etc.) for danger and defect elimination within his area of competence, and/or demand them if they are beyond his area of competence.
- Can declare sanctions as per section 5.4 and impose them accordingly.
- Can initiate emergency shut-off of electrical installations used by his organisational unit as per R2.5.3.2.1 regulations.
- Generally has the right to audit the nominated person in control of an electrical installation during work activities at any time without notice, to check the training and experience of employees of third party companies carrying out work on electrical installations for which Swisscom AG is the proprietor, and to demand that the relevant basic requirements are met.

Other authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.5 nominated person in control of an electrical installation during work activities

The Nominated person in control of an electrical installation during work activities is a person who is assigned direct responsibility for operation of the electrical installation.

NOTE: This is limited by the fact that for “operation” only the period necessary for carrying out the respective work should be taken into account [19].

It may be practical for the role of the nominated person in control of an electrical installation during work activities and the nominated person in control of a work activity to be performed by the same person. In many cases this situation occurs automatically in practice [19]. See section 2.1.

B3.2.5a Nominated person in control of an electrical installation during work activities of a high voltage distribution network

B3.2.5b Nominated person in control of an electrical installation during work activities of a high voltage site network

B3.2.5c Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations at the FM provider

B3.2.5d Nominated person in control of an electrical installation during work activities of low and extra-low voltage infrastructure installations

B3.2.5e Nominated person in control of an electrical installation during work activities of low and extra-low voltage telecommunications installations

Requirements

- Is a skilled person (electrically).
- Knows the operational procedures.
- Can communicate in the official regional language to at least level B2 of the Common European Framework of Reference for Languages (CEFR).

The role of nominated person in control of a work activity also requires [19][46]:

- Knowledge of the operating condition of the electrical installation;
- Ability to evaluate the impact of planned work on the safe operation of the electrical installation;
- Ability to identify the particular dangers present during work on or in the vicinity of electrical installation.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary

Activity	Scope	Frequency
2.7.7b ¹⁰³ First aid for electrical and electrolyte accidents	First aid (BLS); CPR / AED; Rescuing patients in electrical installations; Rescuing patients in battery installations.	When taking up the post and repeated within three years
2.7.7c ¹⁰³ Work safety	Conduct during an incident; Preventing measures; Access.	On first scheduled access and repeated within two years
2.7.7d ¹⁰³ Order process	Issuing of the order; Monitoring and auditing of work locations; Electrical safety; Supporting outside personnel; Documentation (safety record, conformity).	Before schedule work and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.4	Before first scheduled live working and repeated within two years
2.7.7f ¹⁰³ Live working	Working procedures s: Personal protective equipment against electrical hazards	When taking up the post and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering; Working procedures s; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.5: Nominated person in control of an electrical installation during work activities requirements

¹⁰³ Relates to B3.2.5c only, all others (B3.2.5a, B3.2.5.b, B3.2.5.d, B3.2.5e) optional

Duties

- Ensures that when work is carried out on or in the vicinity of electrical installations the particular dangers associated with the electrical installation are taken into account and the safe operation of the electrical installation is maintained [19][46].
- Ensures that the person responsible for an electrical installation is informed before work is carried out [19].¹⁰⁴
- Grants authorisation for work on or in the vicinity of the electrical installation. He is responsible for implementing the safety principles and regulations of the Electrical Safety Concept locally.
- He is responsible for issuing instructions to the nominated person in control of a work activity, and specifying and supervising work procedures. When performing these duties he must consistently adhere to the safety principles and regulations set out in the safety concept.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Administrative and quality assurance duties¹⁰⁵

- Is responsible for the implementation and observance of the safety principles and rules of this Electrical Safety Concept. This includes in particular:
 - Order process;
 - Access;
 - Training;
 - Electrical safety record;
 - Maintenance.

The following duties must also be performed by the nominated person in control of an electrical installation during work activities:

- Planning of measures and documentation of system security as per section 4:
 - Ensuring that for all work, he receives the necessary documents, such as conformity declarations, safety records, measurement reports, plans, diagrams, keys, etc., and that these are stored with the installation if necessary;
 - Organises and coordinates acceptance and spot check inspections as per NIV;
 - Archives the original copy of the safety record and provides the NIV central office with a copy.
- In case of operational faults, informs the delegated proprietor in writing within one working day of the action and its outcome and consequences.
- Gives instruction regarding access to rooms as per section 2.3 on site, if applicable, and coordinates work carried out by multiple contractors.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

¹⁰⁴ Relates to B3.2.5a, B3.2.5b, B3.2.5d and B3.2.5e. For B3.2.5c only applies for live working2 working procedures.

¹⁰⁵ Relates to B3.2.5c only

Authorisations

- Can approve resources (finance, personnel, etc.) for danger and defect elimination within his area of competence, and/or demand them if they are beyond his area of competence.
- Can declare sanctions as per section 5.4 and impose them accordingly.¹⁰⁶
- Is authorised to give switching instruction. This means he must give instruction regarding switches on high voltage installations and switches on complex low voltage installations.
- Can initiate emergency shut-off of electrical installations as per regulations R2.5.3.2.1 and give instructions to change the operating condition of the electrical installations.
- Generally has the right, at any time and without notice, to check the training and experience of employees of third party companies carrying out work on electrical installations for which Swisscom AG is the proprietor, and to demand that the relevant basic requirements are met.¹⁰⁶

Other authorisations for work, in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.2.

¹⁰⁶ Relates to B3.2.5c only

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.6 Nominated person in control of a work activity

The nominated person in control of a work activity is a person who is assigned direct responsibility for performance of the work at the work location.

Requirements

- Is generally a skilled person.
 - Depending on the nature of the work, an instructed person may also take on the role of a nominated person in control of a work activity.
- Can communicate in the official regional language to at least level B2 of the Common European Framework of Reference for Languages (CEFR).

The role of nominated person in control of a work activity also requires[19][46]:

- Knowledge of the work assigned and experience in carrying out such work;
- Knowledge of the applicable provisions and standards for carrying out the work assigned;
- Ability to assess the work assigned;
- Ability to identify the dangers associated with the work assigned.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years unless included in the basic training
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7c Work safety	<i>Optional:</i> <i>Access</i>	On first scheduled access and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.6	Before schedule work and repeated within two years

Activity	Scope	Frequency
2.7.7f Live working	<i>Optional: Working procedures; Personal protective equipment against electrical hazards.</i>	Before first scheduled live working and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering; Working procedures; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.6: Requirements of a nominated person in control of a work activity

Duties

- Before and during work the nominated person in control of a work activity must ensure that all safety requirements applicable to their work, safety rules and company instructions are observed while the work is being carried out.
- Must instruct all persons involved in the work of all reasonably foreseeable dangers of which they would not automatically be aware.
- Ensures that persons carrying out work receive relevant instruction beforehand and on completion.
- Issues the permission to start work:
 - in writing, for high voltage installations and complex low and extra-low voltage installations;
 - verbally for all other installations.
- Implements the safety principles and regulations of the Electrical Safety Concept on site.

Other duties and responsibilities are shown in responsibility matrix A3.2.1.

Authorisations

Authorisations for activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.7 Skilled persons (electrically)

Are persons who are skilled persons or hold an equivalent qualification and are technical experts as per Art. 3 paragraph 23 StV.

- B3.2.7a Skilled person (electrically)
- B3.2.7b Skilled person for low and extra-low voltage
- B3.2.7c Skilled person for high voltage
- B3.2.7d Skilled person for electrical safety
- B3.2.7e Skilled person for electrical safety of high-availability installations
- B3.2.7f Authorised skilled person (electrically)

Requirements

The following requirements for training and instruction must be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7c Work safety	Conduct during an incident; Preventing measures Access.	When taking up the post and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.2	When taking up the post and repeated within two years

Activity	Scope	Frequency
2.7.7g Activity-specific continuing training in general	Technical and informational training; Principles of engineering; Working procedures; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.8: Requirements for instructed persons

Duties

- Carrying out work on electrical installations as per order.

Authorisations

Authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.8 Instructed persons

The following groups of personnel employed by Swisscom AG, the FM provider or external parties receive basic instruction regarding electrical dangers and are therefore authorised to carry out a very limited number of activities, which can be classified as non-hazardous, in the vicinity of electrical installations.

- B3.2.8a Swisscom AG proprietor and person responsible for an electrical installation
- B3.2.8b Swisscom AG project manager / service manager
- B3.2.8c Swisscom AG
- B3.2.8d FM provider with switching authorisation
- B3.2.8e FM provider
- B3.2.8f Security service, reception staff, cleaning staff
- B3.2.8g Colocation partners

The following other groups of persons receive electrical instruction specific to their activities:

- B3.2.8h Fire service
- B3.2.8i External parties

Basic principle

If in doubt, bring in an expert!

Requirements

The following requirements for training and instruction must be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7c Work safety	<i>Optional:</i> <i>Access</i>	On scheduled access and repeated within two years

Activity	Scope	Frequency
2.7.7e Authorisation, duties, competence and responsibility	B3.2.8 ¹⁰⁷	When taking up the post and repeated within two years
2.7.7h Activity-specific continuing training of instructed persons	Personal protective equipment against electrical hazards; Area of activity; Replacement of cartridge fuses; Resetting of circuit breakers and residual current devices; Measurement; Conduct in electrical installations.	Before schedule work and repeated within two years

Table B3.2.8: Requirements for instructed persons

Duties

- Carrying out work on electrical installations for which the members of the respective groups of people have received explicit training and which they have practised.

Authorisations

Authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

¹⁰⁷ Authorised B3.2.8h also requires A3.2.8 instruction or SC / FM provider training specific to the activity with evidence

Authorisation, duties, competence and responsibility
for work in the vicinity of electrical installations

B3.2.9 Ordinary persons (electrically)

Are persons who are not qualified skilled persons, do not hold an equivalent qualification and are not instructed persons.

Basic principle

If in doubt, bring in an expert!

Requirements

The following requirements for training and instruction must be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years

Table B3.2.9: Requirements for ordinary persons (electrically)

Duties

- Assisting with implementation of the provisions for prevention of work accidents and occupational illnesses;
- Correct use of safety equipment (removal or modification of safety equipment is not permitted);
- Reporting defects in electrical installations or products to their supervisor or the contact person for the specific object.

Authorisations

Authorisations in compliance with the safety principles and regulations are shown in the authorisation matrix A3.2.2.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.10.1 Authorised person for general installation work (Art. 9 NIV)

Requirements

- Is a qualified skilled person and an employee of a company with a general installation permit as per Art. 9 NIV (permit for companies) [6].
 - Apprentices and assistants may only carry out installation work under the instruction and supervision of skilled persons [6].
- If he carries out work on the primary and secondary supply of low and extra-low voltage installations, he must have the competence of a skilled person for low and extra-low voltage.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.1	Before schedule work and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training; Principles of engineering; Working procedures s; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.1: Requirements for Authorised person for general installation work

Duties

- Preparation of general installations in objects within the scope of this safety concept.
- Before commissioning of the electrical installation or parts thereof, a concomitant initial inspection must be carried out and documented [6].
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for general installation work and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.10.2 Authorised person for work on company-owned installations (Art. 13 NIV)
Requirements

- Holds a permit as per Art. 13 NIV (Permits for work on company-owned installations).
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years unless included in the basic training
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.2	When taking up the post and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering; Working procedures s; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.2: Requirements for Authorised person for work on company-owned installations

Duties

- Work on company-owned installations in objects within the scope of this Electrical Safety Concept and that of the permit.
- Implementation and documentation of final checks on the installations carried out by him and handover of the signed statements (A3.2.7.2) to the electro agent. The electro agent keeps the statements for submission to the inspection body.
- Maintenance of a statement of the work carried out, in place of a safety record.
- Supervision of outside personnel carrying out work assigned to them.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for work on company-owned installations and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3 and A3.2.7.1.

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.10.3 Authorised person for installation work on special installations (Art. 14 NIV)

- B3.2.10.3a Swisscom AG
- B3.2.10.3b FM provider
- B3.2.10.3c External parties

Requirements

- Holds a permit as per Art. 14 NIV (Permits for installation work on special installations).
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years unless included in the basic training
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.3	Before schedule work and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering; Working procedures s; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.3: Requirements for Authorised person for installation work on special installations

Duties

- Preparing installations in objects within the scope of this safety concept and that of the permit.
- Implementation and documentation of final checks on the installations carried out by him and handover of the signed statements (A3.2.7.2) to the electro agent.¹⁰⁸ The electro agent keeps the statements for submission to the inspection body.
- Maintenance of a statement of the work carried out, in place of a safety record.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for installations on special installations and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3 and A3.2.7.1¹⁰⁸.

¹⁰⁸ for employees only B3.2.10.3a Swisscom AG

Authorisation, duties, competence and responsibility

for work in the vicinity of electrical installations

B3.2.10.4 Authorised person with connection permit (Art. 15 NIV)

- B3.2.10.4a Swisscom AG
- B3.2.10.4b FM provider
- B3.2.10.4c External parties

Requirements

- Holds a permit as per Art. 15 NIV (connection permit).
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years unless included in the basic training
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.4	Before schedule work and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering; Working procedures s; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.4: Requirements Authorised person with connection permit

Duties

- Repair and replacement of electrical products on installations in accordance with the scope of this safety concept and that of the permit.
- Implementation and documentation of final checks on the installations carried out by him and handover of the signed statements (A3.2.7.2) to the electro agent.¹⁰⁹ The electro agent keeps the statements for submission to the inspection body.
- Maintenance of a statement of the work carried out, in place of a safety record.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for the connection of electrical products and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3 and A3.2.7.1¹⁰⁹.

¹⁰⁹ for employees only B3.2.10.4a Swisscom AG

Authorisation, duties, competence and responsibility
for work in the vicinity of electrical installations

B3.2.10.5 Authorised person for work on products, NEV

Requirements

Installation	Competence
Low voltage switchgear combination Tertiary supply	<ul style="list-style-type: none"> • Skilled person (electrically)
Low voltage switchgear combination Primary and secondary supply	<ul style="list-style-type: none"> • Skilled person for low and extra-low voltage
High voltage switchgear combination	<ul style="list-style-type: none"> • Skilled person for high voltage
Power supply systems	<ul style="list-style-type: none"> • Skilled person with system-specific training
Cabinet combinations, telecommunications installations	<ul style="list-style-type: none"> • Activity-specific trained skilled person, or • Activity-specific instructed person
Compact installations, telecommunications installations	<ul style="list-style-type: none"> • Activity-specific trained skilled person, or • Activity-specific instructed person
Other products	<ul style="list-style-type: none"> • Skilled person or • Activity-specific instructed person

Table B3.2.10.5: Competency requirements for Authorised person for work on products

- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.
- The authorised person must be instructed on the authorisations, responsibilities and requirements listed here prior to planned work and repeated after a maximum of two years.

Duties

- Construction, extension, repair and replacement of electrical products in objects in accordance with the scope of this safety concept.
- Performing and documenting inspections and tests on the products he works on.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for construction, extension, repair and replacement of electrical products and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3 and A3.2.7.2¹¹⁰.

¹¹⁰ only for Swisscom AG employees

Authorisation, duties, competence and responsibility for work in the vicinity of electrical installations

B3.2.10.6 Authorised person for work on installations as per the Heavy Current Ordinance, (StV)

Requirements

Installation	Competence
High voltage installations	<ul style="list-style-type: none"> Skilled person for high voltage
Low and extra-low voltage infrastructure installations	<ul style="list-style-type: none"> Skilled person or activity-specific instructed person
Low and extra-low voltage telecommunications installations	<ul style="list-style-type: none"> Activity-specific trained skilled person or activity-specific instructed person

Table B3.2.10.6.1: Competency requirements for Authorised person for work on installations as per the Heavy Current Ordinance, StV

- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	When taking up the post and repeated within two years unless included in the basic training
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within three years
2.7.7c Work safety	<i>Optional:</i> <i>Access</i>	On first scheduled access and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.6	Before schedule work and repeated within two years

Activity	Scope	Frequency
2.7.7g Activity-specific continuing training in general	Technical and informational training; Principles of engineering; Working procedures; Earthing of installations; Measurement and inspection; Switching.	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.6.2: Requirements for Authorised person for work on installations as per the Heavy Current Ordinance, StV

Duties

- Creation of installations as per the Heavy Current Ordinance in objects within the scope of this safety concept.
- Performing and documenting inspections and tests on the installations worked on as per the Heavy Current Ordinance.
- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

Authorisations

Authorisations for installation work as per the Heavy Current Ordinance and activities as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3.

Authorisation, duties, competence and responsibility for work in the vicinity of electrical installations

B3.2.10.7 Authorised person for inspections and tests

- B3.2.10.7a Inspection of low and extra-low voltage (NIV)
- B3.2.10.7b Inspection of high-availability installations of low and extra-low voltage (NIV)
- B3.2.10.7c Inspection of heavy current installations (StV)
- B3.2.10.7d Testing of electrical devices (NEV)

Requirements

Installation	Competence
Inspection of low and extra-low voltage according to NIV (all installations except for high-availability installations)	<ul style="list-style-type: none"> Skilled person for inspection
Inspection of low and extra-low voltage according to NIV (high-availability installations)	<ul style="list-style-type: none"> Skilled person for inspection of high-availability installations¹¹¹
Inspection of low and extra-low voltage according to StV	<ul style="list-style-type: none"> Activity-specific trained skilled person, or Activity-specific instructed person
Inspection of high voltage according to StV	<ul style="list-style-type: none"> Skilled person for high voltage or Activity-specific instructed person
Testing of electrical devices	<ul style="list-style-type: none"> Skilled person or Activity-specific instructed person

Table B3.2.10.7.1: Requirements for Authorised person for inspections and tests

- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also meet the requirements as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also meet the requirements as per B3.2.6.

The following requirements for training and instruction must also be met:

Activity	Scope	Frequency
2.7.7a Fundamentals and dangers of electricity	Fundamentals of electricity; Fundamentals of electrical installations; Fundamentals and dangers of electricity.	Core competence in basic training, no repetition necessary

¹¹¹ For 48 V DC power supply systems and final checks, an a skilled person for the inspection with relevant training from Swisscom AG is sufficient

Activity	Scope	Frequency
2.7.7b First aid for electrical and electrolyte accidents	<i>Optional:</i> <i>First aid (BLS);</i> <i>CPR / AED;</i> <i>Rescuing patients in electrical installations;</i> <i>Rescuing patients in battery installations.</i> <i>Mandatory:</i> (at least 1 person per work location)	When taking up the post and repeated within two years
2.7.7c Work safety	<i>Optional:</i> <i>Access</i>	On first scheduled access and repeated within two years
2.7.7e Authorisation, duties, competence and responsibility	B3.2.10.7	Before schedule work and repeated within two years
2.7.7g Activity-specific continuing training in general	Technical and informational training: Principles of engineering Working procedures Earthing of installations Measurement and inspection Switching	At least one module when taking up the post and per year At least 1 day per year

Table B3.2.10.7.2: Requirements for Authorised person for inspections and tests

Duties

- If the Authorised person takes on the role of nominated person in control of an electrical installation during work activities, he must also carry out the duties as per B3.2.5.
- If he takes on the role of nominated person in control of a work activity, he must also carry out the duties as per B3.2.6.

B3.2.7.7a Inspections of low and extra-low voltage

- Carrying out final, acceptance or periodic inspections in accordance with NIV on installations in objects within the scope of this safety concept.
- Preparing inspection reports, safety records with detailed measurement and test documents of the inspected installations.

B3.2.7.7b Inspection of high-availability installations of low and extra-low voltage

- Carrying out acceptance inspections or periodic inspections in accordance with NIV on high-availability installations in objects within the scope of this safety concept.
- Preparing inspection reports, safety records with detailed measurement and test documents of the inspected installations.

B3.2.7.7c Inspection of heavy current installations

- Preparing final and periodic inspections according to StV on installations in objects within the scope of this safety concept.
- Preparing inspection reports as well as detailed measurement and test documents of the controlled installations.

B3.2.7.7d Testing electrical devices

- Carrying out recurrent test and test after repair work on electrical equipment in objects within the scope of this safety concept.
- Preparing inspection reports as well as detailed measurement and test documents of the tested electrical equipment.

Authorisations

Authorisations for inspections and tests as per work application (A2.5.2), in compliance with the safety principles and regulations of this safety concept, are shown in the authorisation matrix A3.2.3.

R Rules

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Rules

for work in the vicinity of electrical installations

R2.3 Access

Access means unlocking doors and entering operating areas of electrical installations, electrical operating rooms, battery rooms and telecommunications installations operating rooms and does not include any other activities.

Levels of access:

- R2.3.1 Operating area of electrical installations
- R2.3.2 Electrical operating room
- R2.3.3 Battery room
- R2.3.4 Telecommunications installations operating room

Rules for access:

- Rooms are only to be entered with a corresponding work order and access authorisation according to the authorisation matrix A3.2;
- The doors of the rooms are always to be locked when leaving¹¹²;
- Unauthorised persons are to be denied access to the rooms. If an unauthorised person enters the room, he or she is to be turned away. For sanctions see section 5.4;
- Any anomalies or (suspected) discrepancies are to be reported to the person in charge¹¹³ or the relevant supervisor;
- The instructions about dangers and special rules of conduct in the rooms are to be followed. In this regard, the following topics were instructed in advance according to the type of room:
 - Operating area of electrical installations:
 - a. Dangers of approaching live parts (A2.5.3.1);
 - b. Immediate measures and aid in the event of accidents (sections 2.8.3, R2.8 and R2.8.4);
 - c. Installations to be accessed along with information on escape routes and emergency call numbers (subject to local conditions);
 - d. Operational actions and work to be carried out by the personnel (subject to local conditions and situation);
 - e. Procedure in the event of fire (section 2.8.6 and A2.8.6).
 - Electrical operating room:
 - a. Operational actions and work to be carried out by the personnel (subject to local conditions and situation).
 - Battery room:
 - a. Dangers of approaching batteries (R4.1.3);

¹¹² If this is not possible for technical reasons, for example due to cable pulling, the open door must be permanently monitored. The responsibility lies with the nominated person in control of a work activity

¹¹³ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

- b. Immediate measures and aid in the event of accidents with electrolytes (sections 2.8.5, R2.8 and R2.8.5);
- c. Operational actions and work to be carried out by the personnel (subject to local conditions and situation).
- o Telecommunications installations operating room
 - a. Operational actions and work to be carried out by the personnel (subject to local conditions and situation).

Rules for access for visitors:

- Access to the operating area of electrical installations, electrical operating rooms, battery rooms and telecommunications installations operating rooms is only granted to visitors if they are accompanied by an
 - o authorised skilled person,
 - o the nominated person in control of an electrical installation during work activities¹¹⁴ or persons authorised by the latter approved.
- In general, only small groups up to a maximum of 5 people may enter the rooms.
- (SC) The constant safety distance to electrical installations or batteries must be maintained:

Installation	Safety distance
Operating area of electrical installations	150cm
Electrical operating rooms	80cm
Battery rooms	
Telecommunications installations operating room	

¹¹⁴ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

Personnel requirement:

Installation	Competence
Operating area of electrical installations	<ul style="list-style-type: none"> • Skilled person with “Instruction of the persons authorised to enter the operating area”, or • instructed person with “Instruction of the persons authorised to enter the operating area”
Electrical operating room	<ul style="list-style-type: none"> • Skilled person or • Instructed person with “Instruction for electrical operating room” or • “Instruction of the persons authorised to enter the operating area”
Battery room	<ul style="list-style-type: none"> • Skilled person or • Instructed person with “Instruction for electrical operating room” or • “Instruction of the persons authorised to enter the operating area” and additionally “Instruction of the persons authorised to enter the battery room”
Telecommunications installations operating room	<ul style="list-style-type: none"> • Skilled person or • Instructed person with “Instruction for electrical operating room” or • “Instruction of the persons authorised to enter the operating area” or “Instruction of the persons authorised to enter the telecommunications installations operating room”

Table R2.3: Personnel requirement for access

Rules

for work in the vicinity of electrical installations

R2.5.1.1 Supporting outside personnel

This means that the management and supervision of the personnel of a third party company in installations within the scope of this safety concept.

This includes the job briefing, instruction of the specific hazards with appropriate measures in the company, the behaviour at the work location and in an emergency, as well as the procedure after completion of the work and the handover of the work location.

Support is required only in high voltage installations and complex low and extra-low voltage installations.

Rules:

- Only authorised persons according to the authorisation matrix A3.2.2 who are familiar in detail with the assigned tasks and in particular with the risks that may be associated with them are used for supporting outside personnel;
- Clear communication of the principle according to which personnel of a third party company may neither enter installations according to section 2.3 nor carry out activities in the vicinity of electrical installations, or generally on technical installations and equipment, without a clear order and prior instruction;
- Orders shall be described precisely, clarifying in particular:
 - Permitted activities and their associated rules;
 - Compliance with the electrical safety concept is mandatory for third party companies, just like all other relevant rules to ensure work safety and health protection.
- Periodic inspection of compliance with safety regulations during order processing. The inspection findings will be recorded and any improvement measures derived on the basis of the knowledge gained;
- Employees of third party companies have confirmed that they have understood the assignment and have been informed about dangers in connection with your order, as well as the applicable risk-reducing measures. The confirmation shall be made by signing the confirmation of receiving instruction A3.2.8.

Personnel requirement:

Duties	Competence
Supporting outside personnel	Skilled person (electrically)

Table R2.5.1.1: Personnel requirement for supporting outside personnel

Rules

for work in the vicinity of electrical installations

R2.5.1.2 Procurement processes (electrical installations, electrical installations, work and equipment)

Work and system safety begins with the order. Therefore, procurement processes are considered here as a separate rule. These are carried out as described in section 2.5, as well as in the process currently in force at Swisscom AG and the corresponding competences according to the quality management system.

Third party proprietor (owner, lessee, etc.) carry out your procurements according to your in-house processes.

The following rules are binding for all procurements installed or used with electrical installations within the scope of this safety concept.

Rules:

- In general, orders for electrical installations or equipment may only be initiated after an inspection of the records by a skilled person who has an in-depth electrotechnical and electrical safety knowledge as well as an understanding of the process;
- Monitoring of compliance with currently valid standards,
- On receipt, the presence of the CE marking is checked and an appropriate inspection is carried out, or the test results, commissioning checklists, etc. are requested. In addition, an operating manual must be provided by the supplier.
- A conformity declaration is enclosed with every delivery, or a safety dossier is submitted by the creator upon handover of an electrical installation that consists of at least a safety record, including measurement and testing report or statements as per NIV;
 - Any mandatory documents not automatically submitted will be consistently requested. The corresponding documents are systematically filed and retained (see section 4.1);
 - Electrical products or installations without conformity declaration or safety dossier may not be connected to the installations of Swisscom AG. Otherwise, the liability (including any claims for compensation for damages) is transferred directly to the company or persons putting the products or the installation into operation.
- Necessary instruction measures as a result of a procurement are carried out and organised at the appropriate level. Any necessary refresher instruction will be included in the training and instruction plans.

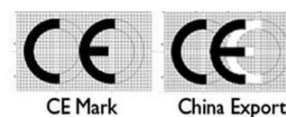


Figure R2.5.1.2: Marking of work and equipment

Most important standards for inspection of the conformity declarations:

Installation	Standard
Electrical installations	SN 411000
Switchgear combinations	EN 61439
Electrical equipment of machines	EN 60204
Audio/video, information and communication technology equipment	EN 62368

Table R2.5.1.2.1: Standards

Personnel requirement:

Duties	Competence
Procurement processes	Ordinary person (electrically)
Review of the records	Skilled person who has an in-depth electrotechnical and electrical safety knowledge as well as an understanding of the process

Table R2.5.1.2.2: Personnel requirement for the procurement process

Rules

for work in the vicinity of electrical installations

R2.5.1.3 Management of construction projects

Rules:

- Draw up clear specifications, with scope of services, interface definition and, in particular, the assignment of proprietor, person responsible for an electrical installation, installation and work responsibility during the various project phases;
- Supervision of proprietor coordination if several proprietors are involved in projects;
- In existing objects, involve the local nominated person in control of an electrical installation during work activities or person responsible for an electrical installation at an early stage;
- The Swisscom AG electrical safety concept must be applied to all activities and processes as the minimum standard;
- Monitoring of control activities according to NIV and their documentation (section 4.1);
- (SC) Monitoring of the work carried out by an independent inspection body (plan and concept control as well as interim and stage acceptance);
- Monitoring the competence of the staff assigned to the project;
- Acceptance or handing over of the installation, taking into account the requirements according to the specifications.

Personnel requirement:

Duties	Competence ¹¹⁵
Management of construction projects	Skilled person (electrically), SC project manager
	Skilled person (electrically), project manager FM provider
	Skilled person (electrically), third party project manager

Table R2.5.1.3: Personnel requirement Managing construction projects

¹¹⁵ If the project manager is not trained as a skilled person, a skilled person must be consulted for technical regulations and decisions

Rules

for work in the vicinity of electrical installations

R2.5.3 Work

Work includes electrical as well as non-electrical work performed on, with or in the vicinity of electrical installations.

The dangers of working in the area of electrical installations are always present and must not be underestimated.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹¹⁶;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹¹⁷;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- Electrical installations and equipment must not be climbed on or stepped on, used as storage (for tools, devices, materials) or for other purposes which exert pressure or torsional forces on the electrical installations and equipment;
- When working above electrical installations and equipment, it must be ensured that falling tools, devices or material cannot damage the electrical installations and equipment or cause a short circuit;
- Work on electrical installations may only be carried out using insulated tools;
- Natural and artificial ventilation measures on electrical installations and equipment must not be impaired by work or by barriers erected for work. In the case of battery installations, the dangers of electrostatic discharge must also be taken into account;
- When working and handling liquids of all kinds, it must be ensured that in the event of a leak, intended or unintended emptying of a container, the liquid cannot get into electrical installations and equipment.
- If work leads to the generation of dust or dirt, appropriate measures must be taken to protect the electrical installations. It must be ensured that dust or dirt particles do not get into the electrical installations (except for atmospheric nanoparticles and fine dust).
- Foreign bodies of any kind in the vicinity of live parts may only be removed by skilled persons;

¹¹⁶ Not required in installations according to 2.1.1.1

¹¹⁷ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

- A defined distance must always be maintained for construction work and other non-electrical work in the vicinity of live parts, such as:
 - Staging work;
 - Work with lifting equipment, construction machines and conveyors;
 - Installation work;
 - Transport work;
 - Painting and renovation work;
 - (SC) Fire protection work;
 - Positioning of other equipment and construction devices,

This applies in particular in the case of swinging out loads, support equipment and lifting tackle.

This distance must be measured from the closest conductor or bare live part.

Electrical dangers in the vicinity of live parts must

be prevented through protection by screen, barrier, enclosure or insulating covering.

This specified distance must be determined based on D_V (A2.5.3.1), increased by another distance.

The following must be taken into account when specifying this:

- System voltage;
- Kind of work;
- Equipment to be used;
- The fact that the involved persons have no electrical expertise.

In addition, Rules R2.5.3.1b (work in the vicinity of live parts) must be applied;

- For electrical work, the relevant rules (R2.5.3.1.X) must also be applied;
- For electrical and non-electrical work within the safety distance of 80 cm for battery installations, Rules R4.1.3 (Activities on battery installations) must also be applied;
- For the use and operation of electrical installations and equipment, Rules R4.1.7 (Use and operation of electrical installations and equipment by ordinary persons) must also be applied.

Personnel requirement:

Installation	Competence
High voltage	<ul style="list-style-type: none"> • Skilled person for high voltage or • Instructed person
Low and extra-low voltage	<ul style="list-style-type: none"> • Skilled person or • Instructed persons or • Ordinary person (electrically)

Table R2.5.3: Personnel requirement for work

Rules

for work in the vicinity of electrical installations

R2.5.3.1a Dead working

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. Whenever possible, electrical installations must be isolated according to the five safety rules before work is carried out on them.



Disconnect, and disconnect on all sides



Secure against re-connection



Verify absence of operating voltage



Earthing and short-circuiting



Protection against adjacent live parts

Definition:

Work on electrical installations that have been reliably de-energised according to the five safety rules to prevent electrical dangers.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹¹⁸;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹¹⁹;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- If a power failure occurs in high-availability installations during the work, the installations must be brought into a safe operating state as quickly as possible; no further work is permitted afterwards. Work must not be continued until a stable supply situation is ensured again;

¹¹⁸ Not required in installations according to 2.1.1.1

¹¹⁹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

- In high-availability installations, work activity may generally only be carried out on one supply network (e.g. network A or network B). This also applies to the higher supply and network levels. The work is to be coordinated accordingly;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities and permission to start work has been given by the nominated person in control of a work activity. If the work is interrupted, a new authorisation from the nominated person in control of an electrical installation during work activities and permission to start work from the nominated person in control of a work activity is required before work can be resumed.

Personal protective equipment against electrical hazards










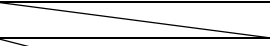
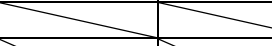
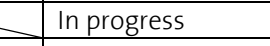
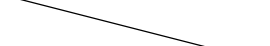

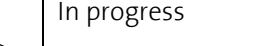

Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Working on installations with contact protection Low and extra-low voltage ≥ IP2X High voltage ≥ IP3X				In progress
Dead working				In progress
Work on installations outside the vicinity zone				In progress
Visual inspection				In progress
Reading measuring instruments				In progress

Table R2.5.3.1a.1: PPE-E dead working

Personnel requirement

Installation	Competence
High voltage installations	<ul style="list-style-type: none"> • Skilled person for high voltage
Low and extra-low voltage installations	<ul style="list-style-type: none"> • Skilled person (electrically) • Instructed persons (electrically)
Telecommunications installations < 60 V DC	<ul style="list-style-type: none"> • Skilled person (electrically) • Instructed persons (electrically)
Telecommunications installations > 60 V DC	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training • Instructed persons with Remote Power Feeding training¹²⁰

Table R2.5.3.1a.2: Personnel requirement for dead working

¹²⁰  The activity-specific instruction must be repeated at least once a year.

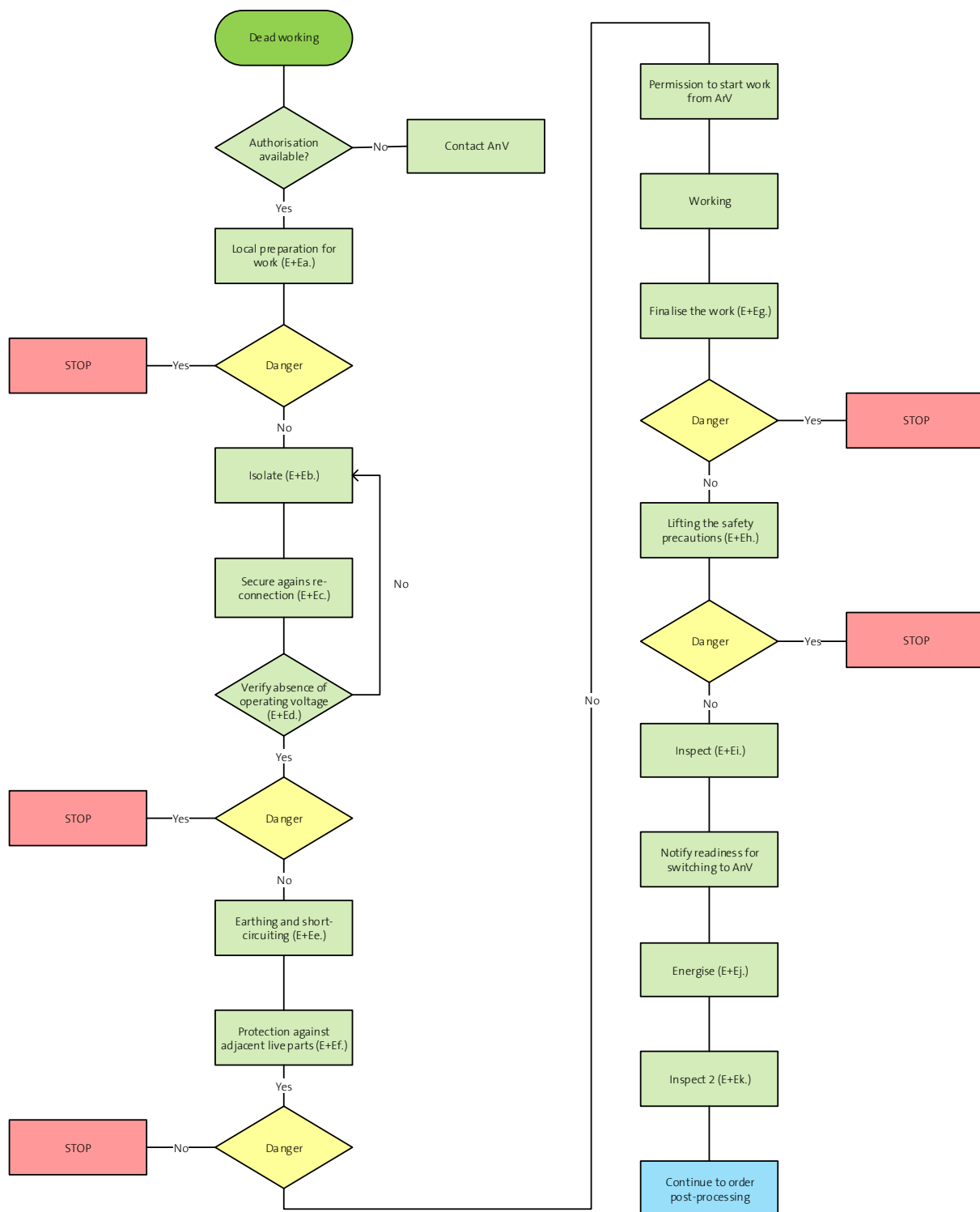


Chart R2.5.3.1a: Dead working [19][40][44]

R2.5.3.1a E+E Dead working

- a. Local preparation for work
 - Have tested tools, measuring instrument, equipment, devices at hand, mark the work location;
 - (SC) Sufficient lighting, emergency lighting;
 - Have at hand: rescue devices (rescue hooks)¹²¹;
 - Ensure freedom of movement and unhindered access;
 - Precautions against non-electrical danger sources;
 - Consult most recent drawings and records;
 - Emergency plan.
- b. Disconnect, and disconnect on all sides
 - by air gaps or equivalent insulation;
 - with required PPE-E;
 - immediately mark affected system parts with warning signs:
 - with the name of the nominated person in control of a work activity in charge and his/her telephone number;
 - Place and date of disconnection;
 - Observe rules R2.5.3.2.1 for switching.
- c. Secure against re-connection:
 - Locking the operating mechanism:
 - Restrict accessibility by locking control cabinets;
 - Blocking of the circuit breakers by shut-off devices;
 - Interruption of the power lines for switching devices with auxiliary power;
 - (SC) continuous visual inspection;
 - further measures.
- d. Verify absence of operating voltage:
 - At the work location all-pole / at each phase conductor;
 - Measuring instrument according to EN 61243 and measurement category 3 (CAT III) according to IEC 61010-2-030¹²²;
 - with required PPE-E.
- e. Earthing and short-circuiting:
 - Provide suitable earthing and short-circuiting devices, if possible visibly located at the work location, in accordance with the respective standards EN 61219/EN 61230;
 - Requirements for high voltage: Always;
 - Requirements for low voltage: When there is a risk of voltage transfers or back feeds (e.g. power generating system; UPS).
 - Requirements for extra-low voltage: If there is a risk of voltage transfers or revers power feeds (e.g. power supply systems).
 - with required PPE-E.



Figure R2.5.3.1a E+E b.:
Switching prohibited

¹²¹ Only for high voltage installations

¹²² Measurement category 4 (CAT IV) according to IEC 61010-2-030 for measurements at the source of the installation and in the primary and secondary distribution

- f. Protection against adjacent live parts
 - If parts of the system near the work location are not isolated, precautions must be taken according to “Work in the vicinity of live parts” rules R2.5.3.1b;
 - with required PPE-E.
- g. Completing work
 - Withdrawal and notification of employees who are not required;
 - All work is stopped, no further work is allowed;
 - Removal of all tools, equipment and devices used.
- h. Lifting of precautions
 - Remove earthing and other safety equipment at the work location;
 - Remove precautions outside the work location;
 - Remove markings.
- i. Inspection 1
 - With required PPE-E;
 - Measuring instrument according to EN 61243 and measurement category 3 (CAT III) according to IEC 61010-2-030¹²³;
 - Visual inspection;
 - Measurements:
 - High voltage:
 - Phase balance.
 - Low voltage:
 - Protective conductor, measuring instrument must comply with EN 61557-4;
 - Insulation resistance.
 - Extra-low voltage:
 - Protective conductor, measuring instrument must comply with EN 61557-4;
 - Insulation resistance.
 - Telecommunications installations:
 - Protective conductor, measuring instrument must comply with EN 61557-4;
 - Insulation resistance positive and negative conductor against protective conductor for final circuits (test voltage 250 V DC);
 - Insulation resistance positive and negative conductor against protective conductor for distribution circuits, the protective conductor must be connected to the positive conductor in the series supply distributor (test voltage 250 V DC).
 - Document results in writing.
- j. Energise
 - With required PPE-E;

¹²³ Measurement category 4 (CAT IV) according to IEC 61010-2-030 for measurements at the source of the installation and in the primary and secondary distribution

k. Inspection 2

- With required PPE-E;
- Measuring instrument according to EN 61243 and measurement category 3 (CAT III) according to IEC 61010-2-030¹²⁴;
- Visual inspection;
- Measurements:
 - High voltage:
 - Rotating field;
 - Voltage.
 - Low voltage:
 - Automatic disconnection in the event of a fault;
 - RCD;
 - Polarity;
 - Rotating field;
 - Voltage drop.
 - Extra-low voltage:
 - Automatic disconnection in case of fault (if required);
 - Polarity;
 - Voltage drop.
 - Telecommunications installations:
 - Current distribution in the case of a parallel conductor.
- Document results in writing.

NOTE: In the case of high voltage installations, the ESTI 100 regulations must also be observed.

¹²⁴ Measurement category 4 (CAT IV) according to IEC 61010-2-030 for measurements at the source of the installation and in the primary and secondary distribution

Rules

for work in the vicinity of electrical installations

R2.5.3.1b Work in the vicinity of live parts

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. In these cases, it is mandatory to work according to the rules listed below.

Definition:

Work in the vicinity zone if accidental, unintentional entry into the live working zone is impossible, e.g.

- Cleaning of heavy current installations in the vicinity zone;
- Attachment or removal of prepared original barriers as well as makeshift barriers with the location of the performer within the vicinity zone;
- Work on in-house measurement and control lines as well as on measurement circuits in the vicinity zone;
- Inspection and measurement in the vicinity zone.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹²⁵;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹²⁶;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- If a power failure occurs in high-availability installations during the work, the installations must be brought into a safe operating state as quickly as possible; no further work is permitted afterwards. Work must not be continued until a stable supply situation is ensured again;
- In high-availability installations, work activity may generally only be carried out on one supply network (e.g. network A or network B). This also applies to the higher supply and network levels. The work is to be coordinated accordingly;
- All personal, electrically conductive objects, such as jewellery, must be removed before starting work. Unless the electrically conductive objects are appropriately insulated by the PPE-E;

¹²⁵ Not required in installations according to 2.1.1.1

¹²⁶ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities and permission to start work has been given by the nominated person in control of a work activity. If the work is interrupted, a new authorisation from the nominated person in control of an electrical installation during work activities and permission to start work from the nominated person in control of a work activity is required before work can be resumed.

Personal protective equipment against electrical hazards

















Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Work within the vicinity zone on installations with contact protection Low and extra-low voltage < IP2X High voltage < IP3X				In progress
Work on live installations within the vicinity zone				In progress
Cleaning within the vicinity zone				In progress
Attachment or removal of prepared original barriers as well as temporary barriers with the location of the person performing the work within the vicinity zone				In progress
Work on in-house measurement and control lines as well as on measurement circuits in the vicinity zone				In progress
Inspection and measurement in the vicinity zone				In progress

Table R2.5.3.1b.1: PPE-E work in the vicinity of live parts

Personnel requirement:

Installation	Competence
High voltage installations	<ul style="list-style-type: none"> • Skilled person for high voltage or • Instructed persons supervises
Low and extra-low voltage installations	<ul style="list-style-type: none"> • Skilled person or • Instructed persons supervises
Telecommunications installations < 60 V DC Tertiary supply	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)
Telecommunications installations < 60 V DC Primary and secondary supply	<ul style="list-style-type: none"> • Skilled person (electrically)
Telecommunications installations > 60 V DC Tertiary supply	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training • Instructed persons with Remote Power Feeding training
Telecommunications installations > 60 V DC Primary and secondary supply	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training

Table R2.5.3.1b.2: Personnel requirement for work in the vicinity of live parts

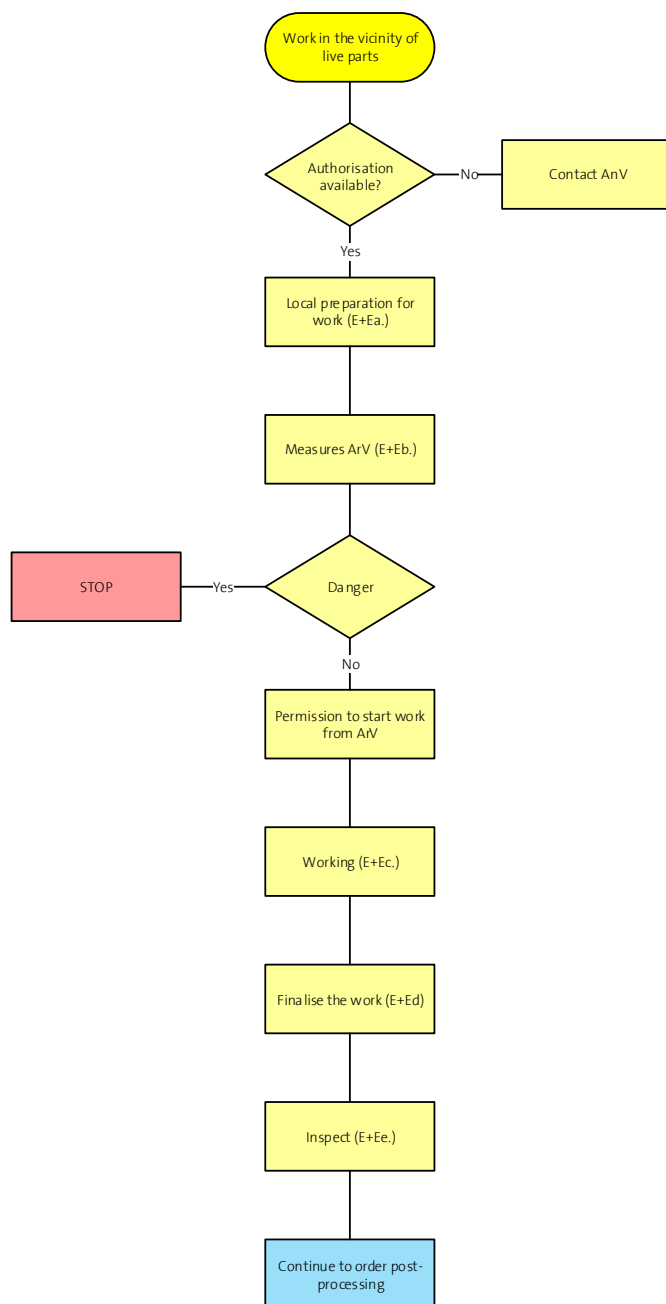


Chart R2.5.3.1b: Work in the vicinity of live parts [19][40][44]

R2.5.3.1b E+E Work in the vicinity of live parts

- a. Local preparation for work
 - Have at hand: tested tools, measuring instrument, equipment, devices;
 - Mark work location;
 - (SC) Sufficient lighting, emergency lighting;
 - Have at hand: rescue devices (rescue hooks)¹²⁷;
 - Ensure freedom of movement and unhindered access;
 - Precautions against non-electrical danger sources;
 - Consult most recent drawings and records;
 - Emergency plan.
- b. Measures by the nominated person in control of a work activity
 - Establish and ensure the specified system status in accordance with the work application;
 - Mark places where automatic re-connection is prohibited:
 - Switch off remote control (only local operation possible);
 - Mark with appropriate symbol;
 - (SC) Ensure communication;
 - Instruct personnel:
 - Scope of work;
 - Precautions;
 - Allocation of duties;
 - Application of tools;
 - Requirements for protective devices;
 - (SC) Continuous supervision;
 - Continuous assessment of environmental conditions.
- c. Work
 - with required PPE-E;
 - Do not wear metal parts (e.g. jewellery);
 - Tools, equipment and devices depending on working methods
 - Example: Insulated tools for live working (IEC 60900).
- d. Completing work
 - Withdrawal and notification of employees who are not required;
 - All work is stopped, no further work is allowed;
 - Removal of all tools, equipment and devices used.
- e. Inspection
 - With required PPE-E;
 - Visual inspection.



Figure R2.5.3.1b B+E b.:
Switching prohibited



Figure R2.5.3.1b B+E c.: Protective equipment
tool set

¹²⁷ Only for high voltage installations

Rules

for work in the vicinity of electrical installations

R2.5.3.1c1 Live working¹

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. In these cases, it is mandatory to work according to the rules listed below.

Definition:

Deliberate, intentional routine work in the live working zone:

- Inspection;
- Measurement;
- Attaching or removing barriers and the like with possible entry into the live working zone.

Rules:



- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹²⁸;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹²⁹;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- If a power failure occurs in high-availability installations during the work, the installations must be brought into a safe operating state as quickly as possible; no further work is permitted afterwards. Work must not be continued until a stable supply situation is ensured again;
- In high-availability installations, work activity may generally only be carried out on one supply network (e.g. network A or network B). This also applies to the higher supply and network levels. The work is to be coordinated accordingly;
- All personal, electrically conductive objects, such as jewellery, must be removed before starting work. Unless the electrically conductive objects are appropriately insulated by the PPE-E;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities and permission to start work has been given by the nominated person in control of a work activity. If the work is interrupted, a new authorisation from the nominated person in control of an electrical installation during work

¹²⁸ Not required in installations according to 2.1.1.1.

¹²⁹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

activities and permission to start work from the nominated person in control of a work activity is required before work can be resumed.

Personal protective equipment against electrical hazards

Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Routine work on live installations within the live working zone				In progress
Cleaning within the live working zone or where there is a possibility of entry into the live working zone				In progress
Attaching or removing prepared original barriers and the like with possible entry into the live working zone				In progress
Work on in-house measurement and control lines as well as on measurement circuits within the live working zone or during possible entry into the live working zone				In progress
Inspection and measurement in the live working zone or during possible entry into the live working zone Low and extra-low voltage ≥ IP2X High voltage ≥ IP3X				In progress
Inspection and measurement in the live working zone or during possible entry into the live working zone Low and extra-low voltage < IP2X High voltage < IP3X				In progress













Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Attachment or removal of prepared original barriers Low and extra-low voltage ≥ IP2X High voltage ≥ IP3X				In progress
Attaching or removing temporary barriers Low and extra-low voltage < IP2X High voltage < IP3X				In progress
Earthing and short-circuiting Low and extra-low voltage ≥ IP2X High voltage ≥ IP3X				In progress
Earthing and short-circuiting Low and extra-low voltage < IP2X High voltage < IP3X				In progress

Table R2.5.3.1c1.1: PPE-E live working1

Personnel requirement:

Installation	Competence
High voltage installations	<ul style="list-style-type: none"> Skilled person for high voltage
Low and extra-low voltage installations of the tertiary supply	<ul style="list-style-type: none"> Skilled person or Instructed persons (electrically)
Low and extra-low voltage installations of the primary and secondary supply	<ul style="list-style-type: none"> Skilled person for low and extra-low voltage
Telecommunications installations < 60 V DC	<ul style="list-style-type: none"> Skilled person or Instructed persons (electrically)
Telecommunications installations > 60 V DC	<ul style="list-style-type: none"> Skilled person with Remote Power Feeding training

Table R2.5.3.1c1.2: Personnel requirement for live working1

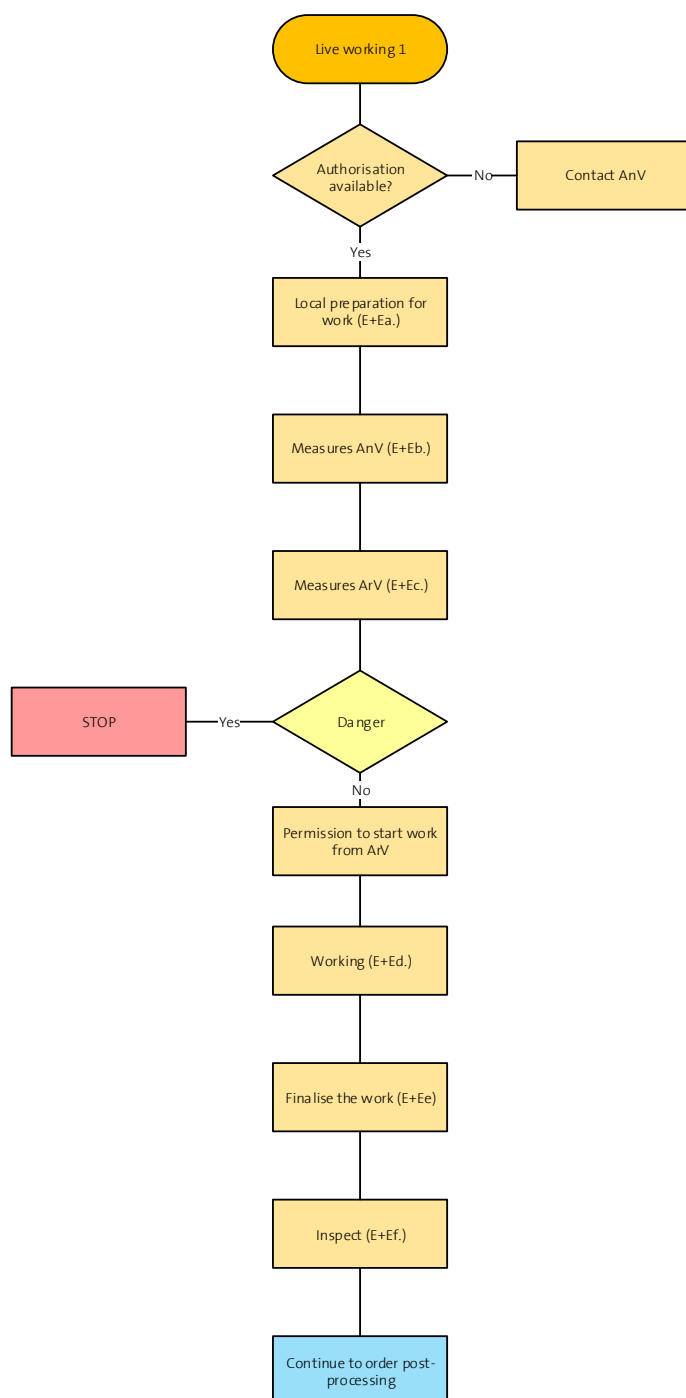


Chart R2.5.3.1c1: Live working1 [19][40][44]

R2.5.3.1c1 E+E Live working¹

- a. Local preparation for work
 - Have at hand: tested tools, measuring instrument, equipment, devices;
 - Mark work location;
 - (SC) Sufficient lighting, emergency lighting;
 - Have at hand: rescue devices (rescue hooks)¹³⁰;
 - Ensure freedom of movement and unhindered access;
 - Precautions against non-electrical danger sources;
 - Consult most recent drawings and records;
 - Emergency plan.
- b. Measures of nominated person in control of an electrical installation during work activities
 - Establish and ensure the specified system condition in accordance with the work application
 - Mark places where automatic re-connection is prohibited:
 - Switch off remote control (only local operation possible);
 - Mark with appropriate symbol;
 - (SC) Ensure communication.
- c. Measures by the nominated person in control of a work activity
 - Instruct personnel:
 - Scope of work;
 - Precautions;
 - Allocation of duties;
 - Application of tools;
 - Requirements for protective devices;
 - (SC) Continuous supervision;
 - Continuous assessment of environmental conditions.
- d. Work
 - with required PPE-E;
 - Do not wear metal parts (e.g. jewellery);
 - Tools, equipment and devices depending on working methods
 - Example: Insulated tools for live working (IEC 60900).
- e. Completing work
 - Withdrawal and notification of employees who are not required;
 - All work is stopped, no further work is allowed;
 - Removal of all tools, equipment and devices used.
- f. Inspection
 - With required PPE-E;
 - Visual inspection.



Figure R2.5.3.1c1 B+E b.:
Switching prohibited



Figure R2.5.3.1c1 B+E d.: Protective equipment
tool set

¹³⁰ Only for high voltage installations

Rules

for work in the vicinity of electrical installations

R2.5.3.1c2 Live working²

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. In these cases, it is mandatory to work according to the rules listed below.

Definition:

- Knowing, intentional work in the live working zone;
- Work on company-owned measurement and control lines as well as measurement circuits if accidental, unintended entry into the live working zone cannot be ruled out;
- Work in the vicinity zone without a barrier and if accidental, unintended entry into the live working zone cannot be ruled out.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹³¹;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹³²;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- If a power failure occurs in high-availability installations during the work, the installations must be brought into a safe operating state as quickly as possible; no further work is permitted afterwards. Work must not be continued until a stable supply situation is ensured again;
- In high-availability installations, work activity may generally only be carried out on one supply network (e.g. network A or network B). This also applies to the higher supply and network levels. The work is to be coordinated accordingly;
- All personal, electrically conductive objects, such as jewellery, must be removed before starting work. Unless the electrically conductive objects are appropriately insulated by the PPE-E;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities and permission to start work has been

¹³¹ Not required in installations according to 2.1.1.1

¹³² This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

given by the nominated person in control of a work activity. If the work is interrupted, a new authorisation from the nominated person in control of an electrical installation during work activities and permission to start work from the nominated person in control of a work activity is required before work can be resumed;

- Live working2 is prohibited on systems with PPE-E protection level (equivalent arc energy) > 318 kJ and on high voltage installations and remote power feeding > 60 V DC;
- Live working2 is prohibited for Swisscom AG and FM provider employees.

Personal protective equipment against electrical hazards










Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Work on live installations				In progress
Extending, modifying, maintaining or doing similar work directly on live parts or where there is a possibility of entry into the live working zone				In progress
Extending, modifying, maintaining or doing similar work in the vicinity zone or in the event of possible entry into the live working zone				In progress

Table R2.5.3.1c2.1: PPE-E live working2

Personnel requirement:

Installation	Competence
Low and extra-low voltage installations of the tertiary supply	2 x skilled persons with special training and qualification, one as supervisor (ArV)
Low and extra-low voltage installations of the primary and secondary supply	2 x skilled persons for low and extra-low voltage with special training and qualification, one as supervisor ("Arbeitsverantwortlicher")

Table R2.5.3.1c2.2: Personnel requirement for live working2

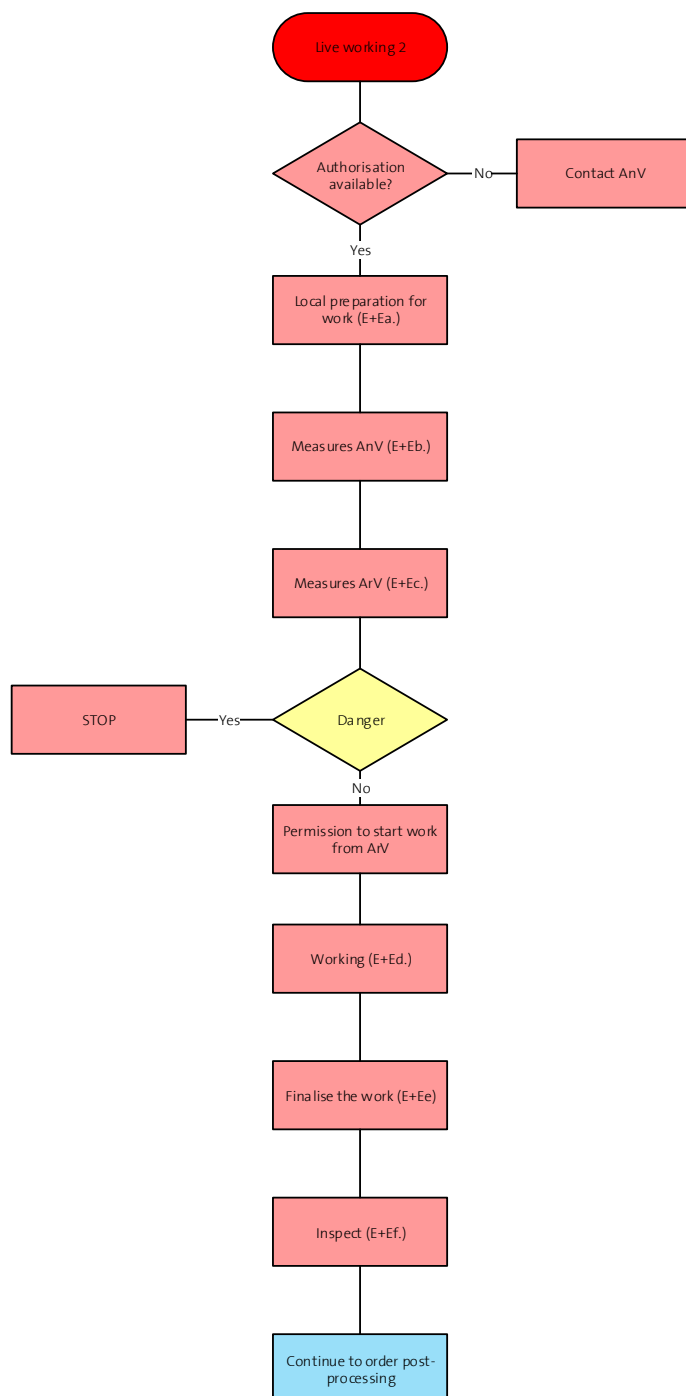


Chart R2.5.3.1c2: Live working2 [19][40][44]

R2.5.3.1c2 E+E Live working2

- a. Local preparation for work
 - Have tested tools, measuring instruments, equipment, devices at hand, including operating manuals;
 - Mark work location;
 - (SC) Sufficient lighting, emergency lighting;
 - Ensure freedom of movement and unhindered access;
 - Precautions against non-electrical danger sources;
 - Consult most recent drawings and records;
 - Emergency plan.
- b. Measures of nominated person in control of an electrical installation during work activities
 - Establish and ensure the specified system status in accordance with the work application;
 - Mark places where automatic re-connection is prohibited:
 - Switch off remote control (only local operation possible);
 - Mark with appropriate symbol;
 - (SC) Ensure communication.
- c. Measures by the nominated person in control of a work activity
 - Instruct personnel:
 - Scope of work;
 - Precautions;
 - Allocation of duties;
 - Application of tools;
 - Requirements for protective devices;
 - (SC) Continuous supervision;
 - Continuous assessment of environmental conditions.
- d. Work
 - with required PPE-E;
 - Do not wear metal parts (e.g. jewellery);
 - Tools, equipment and devices depending on working methods
 - Example: Insulated tools for live working (IEC 60900).
- e. Completing work
 - Withdrawal and notification of employees who are not required;
 - All work is stopped, no further work is allowed;
 - Removal of all tools, equipment and devices used.
- f. Inspection
 - With required PPE-E;
 - Visual inspection.



Figure R2.5.3.1c2 B+E b.:
Switching prohibited



Figure R2.5.3.1c2 B+E d.: Protective equipment
tool set

Rules

for work in the vicinity of electrical installations

R2.5.3.2.1 Switching

R2.5.3.2.1a High voltage

This point covers all operating activities on company-owned high voltage installations. This applies to both company operating activities and those in the event of an incident.

R2.5.3.2.1b Low and extra-low voltage primary and secondary supply

This point includes all lines of the primary and secondary supply as well as lines with a large short-circuit energy.

At the low voltage level, switching with low voltage high-power fuses ("NH systems") in open design poses a particular risk. In general, large to very large damage must be expected in the event of a fault in high-power installations.

R2.5.3.2.1c Low and extra-low voltage tertiary supply

This point covers all lines of the tertiary supply, i.e. end circuits. If the operating activity is carried out on installations by ordinary persons, no increased risks are to be assumed. In the other installations, operating activities may only be carried out by instructed persons.

R2.5.3.2.1d General energy generation plants

This activity exclusively includes the operational and emergency switching of photovoltaic installations on Swisscom AG objects and other non-critical energy generation plants.

R2.5.3.2.1e Operationally critical energy generation and storage installations

This activity includes exclusively the operational and emergency switching of diesel generators, UPS and SVA installations.

Recommendation:

- Whenever possible, switch load-free or with reduced load;
- In the case of complex circuits or high risks, the circuits are to be carried out in pairs.

Rules:

- Switching is only carried out with the corresponding switching authorisation according to the authorisation matrix A3.2;
- Switching operations may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities. If a switching order is interrupted, a new authorisation from the nominated person in control of an electrical installation during work activities is required to start the switching operations;
- A deviation from the switching order without the authorisation of the nominated person in control of an electrical installation during work activities is not permissible;
- For operating activities, the rules R2.5.3.1a must be followed; in addition, the permission to start work by the nominated person in control of a work activity is required. If the work is interrupted, a new authorisation from the nominated person in control of an electrical installation during work activities and permission to start work from the nominated person in control of a work activity is required before work can be resumed.

- For all switching operations on high voltage installations and on complex low voltage installations, a written switching order with associated risk assessment A2.5.3.2 is mandatory. For "standard" switching operations, there are prepared switching programmes which are used for known switching state changes;
- In high-availability installations, remote switching operations are only permitted in the event of operating disruptions. Planned switching operations must be performed locally. If multiple over-current protection devices arranged in series must be switched during activities on a network, the top-down principle must be applied. This means that the over-current protection devices closest to the energy source must be switched first. Then the other over-current protection devices in the secondary supply are switched and finally those of the tertiary supply;
- Over-current protection devices in non-arc-safe design should only be switched without load.
- Switching orders are created by a skilled person, then checked and confirmed by the nominated person in control of an electrical installation during work activities as per the personnel assignment list of the object group- or object-specific safety concept;
- In the event of uncertainties or if a necessary change in the switching order is detected consultation with the nominated person in control of an electrical installation during work activities is mandatory. Contact via the defined contact points on the switching order;
- For manual switching locally, the PPE-E (section 3.3.2) is worn on the basis of the risk assessment carried out;
- When installations are switched off, they must always be inspected by 2 persons (with 2 different measuring instruments) for the absence of operating voltage and secured against re-connection. High voltage installations and low voltage and extra-low voltage installations where there is a risk of voltage transfer or back-feeding must be earthed;
- After activating protective devices from high voltage lines without automatic re-energising, search circuits may be carried out to locate the fault location, taking into account the circumstances [39]. Procedure in case of:
 - Short circuit
Search circuits shall be kept to a minimum. Existing relay protection and short-circuit indicators must be taken into account;
 - Earth fault
Switch on the faulty line at a separate transformer to reduce the earth fault current or proceed as for short circuit.
- In the event of an incident, the following functions (persons) can initiate an emergency shutdown in consultation with the nominated person in control of an electrical installation during work activities¹³³:
 - Nominated person in control of an electrical installation during work activities;
 - Proprietor and delegated proprietor;
 - Person responsible for an electrical installation and nominated person responsible for an electrical installation;
 - Electrical safety officer;
 - Electro agent;

¹³³ In the event of acute danger and if it is not possible to reach the nominated person in control of an electrical installation during work activities within a reasonable period of time, any person may carry out the emergency shutdown of installations with an emergency stop switch without the his/her prior permission

- Fire brigade;
- Local grid operator.

Personal protective equipment against electrical hazards







Activity	PPE-E level			Example
	Telecommunications installations ≤ 60 V DC	Low and extra-low voltage	High voltage	
Activation of the installation, Arc-safe design Low and extra-low voltage ≥ IP2XC				NHS load-break switch, Circuit-breaker
Activation of the installation, Open design Low and extra-low voltage < IP2X				NHS disconnecter, Disconnecter
Activation of the installation, enclosed and sealed design High voltage ≥ IP3XD				Compact switchgear
Activation of the installation, Open design High voltage < IP3X				Load disconnectors

Table R2.5.3.2.1.1: PPE-E Switching

Personnel requirement:

Installation	Competence
High voltage	<ul style="list-style-type: none"> • Skilled person with switching authorisation course, or • Instructed person with switching authorisation course
Low and extra-low voltage primary and secondary supply, General energy generation plants Operationally critical energy generation and storage installations	<ul style="list-style-type: none"> • Skilled person for low and extra-low voltage or • Instructed person
Low and extra-low voltage tertiary supply	<ul style="list-style-type: none"> • Skilled person or • Instructed persons or • Ordinary person (electrically)¹³⁴

Table R2.5.3.2.1.2: Personnel requirement for switching

¹³⁴ Is only permissible if the switchgear combinations are suitable for operation by ordinary persons (IP2XC)

Rules

for work in the vicinity of electrical installations

R2.5.3.2.2 Resetting low and extra-low voltage

This refers to the use of so-called “installations by ordinary persons”, especially those installed in potentially hazardous environments. Installations by ordinary persons include, for example, miniature circuit breakers, screw-in fuses, motor-protective circuit breakers, residual current protection devices, etc. These are considered non-hazardous as long as there is no high short-circuit capacity at the input and everything is properly covered (IP 2XC). If these conditions are not or only partially fulfilled, risks arise that must be taken into account.

Rules:

- Electrical switchgear and control cabinets with the lightning arrow symbol are only opened by instructed persons;
- Switching operations in switchgear and control cabinets with lightning arrow symbol are only carried out if switching operations have been demonstrated and practised as part of instruction. The switching operations are only permitted on parts of the installation where the instruction has taken place. Even under (time) pressure, the prescribed working procedures must not be deviated from under any circumstances;
- Get help if you are unsure;
- No barriers are dismantled or installations are switched where barriers are missing;
- Reset means: One (only!) attempt to switch on a tripped protective device. Other activities are not permitted. If the attempt to switch on remains unsuccessful (renewed triggering of the protective protective device), a troubleshooting measure must be carried out or the responsible or the superior manager must be informed;
- Any anomalies and (suspected) discrepancies are reported to the nominated person in control of an electrical installation during work activities ¹³⁵ or to the manager.



Figure R2.5.3.2.2.1: Screw-in fuse



Figure R2.5.3.2.2.2: Circuit breaker



Figure R2.5.3.2.2.3: Residual current device

Personnel requirement:

Installation	Competence
Low and extra-low voltage Installations by ordinary persons Protection class > IP2XC	<ul style="list-style-type: none"> • Skilled person or • Instructed persons or • Ordinary person (electrically)
Low and extra-low voltage Protection class < IP2XC	<ul style="list-style-type: none"> • Instructed persons or • Skilled person (electrically)

Table R2.5.3.2.2: Personnel requirement resetting

¹³⁵ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

Rules

for work in the vicinity of electrical installations

R2.7.6 Giving instructions

Rules:

- Instruction is carried out strictly in accordance with the safety principles (sections 2 to 4) of the electrical safety concept and based on the relevant rules and authorisation sheets;
- Instruction is documented, with the content of the instruction adapted to the groups of the groups of persons concerned. The person instructed in each case confirms participation by signing the training check;
- Instruction is:
 - carried out in person, or
 - online, if approved by the electrical safety officer.

Personnel requirement:

Duties	Competence
Instruction	<ul style="list-style-type: none"> • Skilled person for electrical safety of high-availability installations or • Authorised skilled person

Table R2.7.6: Personnel requirement Issuing of instructions

Rules

for work in the vicinity of electrical installations

R2.8 Emergency arrangements

In the event of injuries and acute illnesses, rapid and competent help must be ensured. Because most work locations are not permanent locations, the emergency organisation must always be adapted to the specific conditions. The procedure in the event of emergencies (accident, fire) and the important emergency numbers (police, fire brigade, emergency medical services, air rescue service, etc.) must be known to all employees who carry out work for Swisscom AG. The specific emergency information card for Swisscom AG is issued to all internal and external employees.

Information signs with emergency call number and important information on conduct and first aid measures in the event of electrical and electrolyte accidents can be found in the operating area of electrical installations, in electrical operating rooms and battery rooms.

Rules:

- At least 1 person per work location has completed training in conventional first aid and use of the AED within the last three years.
- Rescue and first aid always take priority over reporting unless the notification is required for the rescue or first aid.
- Any incident involving people, personal injury or significant property damage caused by electricity must be reported immediately by calling the emergency number:

Swisscom emergency number 0800 88 00 88

Other important numbers:

Rescue service ("Rettungsdienst")	144
Toxicological Institute	145
Police	117
Fire brigade	118
REGA Swiss rescue helicopter	1414

- The Federal Inspectorate for Heavy Current Installations (ESTI) is contacted exclusively after consultation by the nominated person in control of an electrical installation during work activities or person responsible for an electrical installation with the electrical safety officer.
- Patients may not be transported to the emergency aid location by private vehicles. The corresponding emergency medical services must be utilised.
- In the event of personal injury or significant property damage, no changes may be made to the accident site until the local accident investigation by the Federal Inspectorate for Heavy Current Installations (ESTI) and the state attorney's office has been concluded.
 - This does not apply to required immediate measures for preventing further accidents or damages or ensuring continued operations.

Rules

for work in the vicinity of electrical installations

R2.8.4 First aid for electrical accidents

First Aid with Accidents Involving Electricity

Rescuing victims



Make sure of self-protection, victim still electrified

Low voltage (≤ 1000 V)

Procedure:
Place insulation between victim and rescuer

- Approach victim
- Grab hold of dry, insulating clothes. Possibly use dry piece of clothing.
- Pull out of danger zone

Never touch uncovered body parts or wet items of clothing. Only switch off power source if it is quick and safe to do so

High voltage (≥ 1000 V)

Procedure:
For an electrician or engineer to switch equipment off, call 117 (police) and/or

tel.: _____
(net operator)

Variants for electricians:
Rescue from outside of approach zone using mechanical equipment built to withstand high voltage



S320 Fehrlort
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Electrosuisse
Edition: 2012
Source:
Swiss Resuscitation
Council (SRC)

1. Assess the situation

Talk to the injured, if there is no reaction



2. Raise the alarm

144 Rescue Service

112 Euro SOS

117 Police

118 Fire Brigade

1414 REGA

Who?

Name of caller

What?

Type of emergency

When?

Time of emergency incident

Where?

Place of emergency

How many?

Number of patients,
type of injuries

Further information

Other threats and dangers

3. Check breathing

No or light breathing



Normal breathing



4. CPR measures

Perform 30 chest compressions

- With adults, press the chest down by at least 5 cm



Place in stable lateral position

- Supervise patient



5. Rescue breathing (mouth to nose/mouth to mouth)

2 breaths

- Tilt head to rear, pull chin up



- Give breath until chest rises and falls



Continue with resuscitation until rescue services arrive and take over patient.

6. Defibrillator (AED) (if available)

- Switch on device and follow instructions



- Continue chest compressions and rescue breathing at rate of 30:2 even if defibrillator can be used, unless device gives further instructions

Bleeding

- Keep injured part raised
- Apply compression bandage
- If necessary, press finger to keep wound closed

Burns

- Cool burns as quickly as possible with cool water (approx. 20°C)
- Do not remove clothing
- Dress wound with clean bandage (after cooling)
- Protect patient from hypothermia (undercooling)
- With extensive burns: If patient cannot be hospitalized within one hour after accident, give plenty of liquids to drink if patient is fully conscious

Chart R2.8.4: First aid for an electrical accident

Rules

for work in the vicinity of electrical installations

R2.8.5 First aid for electrolyte accidents

Sicherheits- und Notfalltafel Batterieräume



8320 Fehraltorf
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Electrosuisse
Ausgabe 2015



Explosionsgefahr

Beim Laden von Batterien entsteht ein hochexplosives Knallgasgemisch

- Feuer und Funkenschlag vermeiden
- Nicht rauchen



Batteriesäure ist stark ätzend

Hautätzend, schwere Augenschädigung und korrosiv gegenüber Metallen

- Gesichtsschild oder Schutzbrille tragen
- Säurebeständige Handschuhe tragen
- Säurebeständigen Schutzanzug tragen
- Batterien nicht kippen



Wartungsfreie Batterien mit Gelinhalt

Austretendes Gel bei geplatzten Batterien steht unter Spannung

- Gel nicht mit blossen Händen berühren
- Stromkreis unterbrechen, Spannung minimieren

Vorgehen im Notfall

Alarmieren

144 Rettungsdienst
145 Toxikologisches Institut
112 Euro SOS
117 Polizei
118 Feuerwehr
1414 REGA

Spital
Arzt
Tel. 1
Tel. 2

Meldeschema bei Vergiftungsnotfällen

Wer?

- Alter, Gewicht, Geschlecht des Betroffenen,
- Rückrufnummer

Was?

Alles, was Sie über die betreffende Substanz sagen können

Wann?

Abschätzen der verstrichenen Zeit

Wo?

Ort der Notfallsituation

Wie viel?

Die maximal mögliche aufgenommene Menge abschätzen

Weiteres

- Erste beobachtete Anzeichen
- Erste getroffene Massnahmen

Verhalten bei Kontakt mit Batteriesäure

Nach Einnahme

- Kein Erbrechen herbeiführen
- Höchstens ein Glas Wasser zu trinken geben, sofern der Patient bei vollem Bewusstsein ist

Nach Hautkontakt

- Benetzte Kleider rasch entfernen, Selbstschutz
- Betroffene Hautpartien sofort ausgiebig unter fliessendem Wasser spülen. Bei nicht verätzter Haut gründlich mit Seife und Wasser nachreinigen

Nach Augenspritzern

- Auge sofort während mindestens **10 Minuten** unter fliessendem, nicht zu kaltem Wasser spülen, Augenlider gut offen halten und Wasser von der Nase wefliessen lassen
- Augenarzt aufsuchen

Nach Einatmen

- Patient beruhigen, für frische Luft sorgen

Bei Bewusstlosigkeit

- Stabile Seitenlagerung, keine Flüssigkeit einflässen, kein Brechversuch
- **Immer** Rettungsdienst anfordern (144)

Bei Atem- und Kreislaufstillstand

- Sofortiger Beginn mit Herzdruckmassage, 100/Minute, 5 cm tief
- Geübte Helfer wenden sowohl Herz-Druckmassage als auch Beatmung an im Rhythmus 30:2 bis Rettungsdienst übernimmt

Chart R2.8.5: First aid for an electrolyte accident

Rules

for work in the vicinity of electrical installations

R4.1 Network operator duties

The basis for the planning and implementation of the network operator duties is the grid documentation, which includes on the one hand grid plans and other operational documents (Art. 32 StV) and on the other hand the list of supplied systems (consumers) required according to Art. 33 NIV.

This is about defining the boundaries of the tasks of the network operator in objects in which Swisscom is the network level 5 proprietor. In this respect, different authorisations are assigned to different persons in the authorisation matrix A3.2.

In this context, the following network operator duties are distinguished:

R4.1a Administrative network operator duties:

The person responsible for the administrative network operator duties ensures that safety records are available from all proprietors of electrical installations supplied from low and extra-low voltage distribution networks Swisscom AG and that corresponding random checks are carried out. For this purpose, he keeps a list as described in Art. 33 paragraph 4 NIV. Furthermore, he is responsible for requesting periodic inspections, monitoring the deadlines and archiving the operating documentation and the safety records.

R4.1b Technical network operator duties:

The person responsible for technical network operator duties ensures that safe installations are operated in the supply area. He supports the person responsible for administrative network operator duties and is responsible for the maintenance, expansion and servicing of the network. Furthermore, he checks the submitted installation notifications and safety records for correctness and plausibility.

R4.1c Sovereign spot checks:

The person responsible for the sovereign spot checks carries out the spot checks specified by the person responsible for administrative network operators. He reports the findings of his inspection back to the process owner.

R4.1d Updating documentation (network plans, operational documents, etc.):

The cleaning up and updating of the operating documents are part of the contract for new or conversion projects and are carried out by the contractor carrying out the work. The contractor hands over the adjusted documentation to the person responsible for administrative network operator duties for filing. Any revisions of operating documents that are not project-specific shall be ordered separately by the person responsible.

Personnel requirement:

Duties	Competence
R4.1a Administrative network operator duties	Ordinary person (electrically)
R4.1b Technical network operator duties	Skilled person for inspection
R4.1c Sovereign random checks	Skilled person for inspection
R4.1d Updating documentation	Skilled person (electrically)






Table R4.1: Personnel requirement network operator duties

Rules

for work in the vicinity of electrical installations

R4.1.1 High voltage installation

Installation work requires that the installation is secured according to the five safety rules. For this purpose, the installation must be disconnected completely as follows:

-  Disconnect, and disconnect on all sides
-  Secure against re-connection
-  Verify absence of operating voltage
-  Earthing and short-circuiting
-  Protection against adjacent live parts

For details, see Appendix A2.5.3 and Rules R2.5.3.1a.

Rules:

- A plan approved by the Swiss Federal Inspectorate for Heavy Current Installations (ESTI) must be available before work begins[4];
- Written order and authorisation from the nominated person in control of an electrical installation during work activities before work begins.
- The installation must be earthed and secured against re-connection (switch extended, personal lock, etc.);
- Any adjacent live parts must be covered in such a way that the vicinity zone cannot be reached. Since the installation of barriers is to be classified as work in the vicinity zone, an authorisation is required for this
R2.5.3.1b (Work in the vicinity of live parts);
- Always complete the installation work with an installation check, document test results and submit the completion notification to ESTI in accordance with section 4. Since commissioning and inspection may partly involve work in the vicinity zone, authorisation R2.5.3.1b is required for this (Work in the vicinity of live parts).
 - Electrical products or installations without conformity declaration or safety dossier may not be connected to the installations of Swisscom AG. Otherwise, the liability (including any claims for compensation for damages) is transferred directly to the company or persons putting the products or the installation into operation.

Personnel requirement:

Installation	Competence
High voltage installations	Skilled person for high voltage






Table R4.1.1: Personnel requirements for high voltage installation

Rules

for work in the vicinity of electrical installations

R4.1.2 Low and extra-low voltage installation

Installation work requires that the installation is secured according to the five safety rules. For this purpose, the installation must be disconnected completely as follows:

-  Disconnect, and disconnect on all sides
-  Secure against re-connection
-  Verify absence of operating voltage
-  Earthing and short-circuiting
-  Protection against adjacent live parts

For details see Appendix A2.5.3 and Rules R2.5.3.1a

Rules:

- A general or restricted installation permit in accordance with NIV [6] must be available;
- Prior to commencement of work, an installation notification approved by the grid operator must be available¹³⁶ [6];
- Written order and authorisation from the nominated person in control of an electrical installation during work activities before starting work;
- The installation must be earthed and secured against re-connection (switch extended, personal lock, etc.);
- Any adjacent live parts must be covered in such a way that the vicinity zone cannot be reached. Because the installation of barriers is to be classified as work in the vicinity zone, an authorisation R2.5.3.1b is required for this (work in the vicinity of live parts);
- Because commissioning and inspection may partly be work in the vicinity zone or work under voltage, this also requires an authorisation R2.5.3.1b (Work in the vicinity of live parts) R2.5.3.1c1 (Live working1).
- Always complete the installation work with an installation check, document test findings and prepare a safety dossier consisting of at least one safety record including a detailed measurement and testing report or statements according to sections 4.1.2 or 4.1.3.
 - Electrical products or installations without conformity declaration or safety dossier may not be connected to the installations of Swisscom AG. Otherwise, the liability (including any claims for compensation for damages) is transferred directly to the company or persons putting the products or the installation into operation.

¹³⁶ Low voltage from 3.6 kVA, extra-low voltage from 10 kW

Personnel requirement:

Installation	Competence
Low and extra-low voltage installations of the tertiary supply	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)
Low and extra-low voltage installations of the primary and secondary supply	<ul style="list-style-type: none"> • Skilled person for low and extra-low voltage

Table R4.1.2: Personnel requirement for low and extra-low voltage installation

Rules

for work in the vicinity of electrical installations

R4.1.3 Work on battery installations

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases.

In addition to the risk of electric shock, the current flow in battery installations can also cause hazards. This is because very high currents may flow under fault conditions and the voltage at the battery terminals cannot be switched off [25].

The electrical energy stored in cells or batteries may be released in an unintended and uncontrolled manner due to a short circuit of the terminals. Due to the considerable energy, the heat generated by high current may cause metal melting, sparks, explosion and evaporation of electrolyte [25].

People may work close to the battery installation while performing maintenance work. When working on or near the battery, personnel involved must be competent¹³⁷ in performing such work and must be trained in any special practices required [25].

To minimise the risk of injury, the battery system must have the following:

- Terminal barriers that allow regular maintenance while minimising contact with active parts;
- a minimum distance of 1.50 m between bare conductive active parts of the battery with a potential above DC 120 V (nominal value) which can be touched at the same time;
- fuse link supports which prevent contact with active parts. [25]

During charging, trickle charging and overcharging, gases are released from all secondary cells and batteries except the gas-tight (secondary) cells. This is due to the electrolysis of water by the overcharge current. The gases produced are hydrogen and oxygen. When released into the ambient atmosphere, an explosive mixture can occur if the concentration of hydrogen in air exceeds 4% by volume [25].

When a cell reaches its fully charged state, water electrolysis takes place according to Faraday's law [25]. After the charger stops operating, it can be assumed that the release of gas from the cells has ceased about 1 h after the charging current is switched off [25].

¹³⁷ Competent according to the recognised rules of technology and not according to Art. 8 NIV

Rules for work:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG or FM provider is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation¹³⁸;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;
 - Work is carried out under the direction of a nominated person in control of a work activity;
 - Order post-processing by contractor;
 - Examination of the documents by the person responsible¹³⁹;
 - Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthing may be touched. Shafts and poles must be abandoned;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities;
- Fire, open flames and smoking prohibited [25];
- Before starting the work, the worker must check the location of the nearest source of clean water in order that body parts exposed to electrolyte can be rinsed off with large quantities of water. This can be a water tap or sterile water container. [1002]
 - For closed sterile water containers (eye rinse bottles), check the expiry date before starting work¹⁴⁰;
 - Open water containers (eye rinse bottles) must be rinsed with fresh water and then filled before starting work; [1002]¹⁴⁰
 - In the case of a fixed water connection (water tap), its functioning must be inspected before starting work;
- All personal, electrically conductive objects, such as jewellery, must be removed before starting work. Unless the electrically conductive objects are appropriately insulated by the PPE-E [25];
- Work must always be carried out with insulated tools;
- Batteries must not be connected or disconnected when a current is flowing. The circuit must first be disconnected elsewhere [25];
- For maintenance purposes, batteries with a nominal voltage above DC 120 V should be divided into sections with DC 120 V (nominal) or less [25];
- Protective clothing must be worn to prevent injury due to electrolyte splashes when handling electrolyte and/or closed cells or batteries:
 - Safety glasses or face shield;
 - Protective gloves;
 - Apron [25];

¹³⁸ Not required in installations according to 2.1.1.1

¹³⁹ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

¹⁴⁰ In the case of sealed batteries ≤ 2000 kg and gas-tight batteries ≤ 3000 kg, an available water connection or reserve water is not mandatory. When working on battery installations, the person performing the work must carry his or her own eye rinse bottle.

In the case of sealed or gas-tight batteries, protective goggles and gloves must be worn as a minimum [25][1002].

- Care must be taken not to wear clothing or footwear that can cause electrostatic charges when working [25];
 - When carrying out maintenance work on the battery installation, personnel must wear antistatic footwear [25]. Footwear must be CE marked and must comply with EN 20345 (S2);¹⁴¹
- When doing live work or working in the vicinity of live parts, the appropriate PPE-E must be used (A3.3.2.2);
- Only a cotton cloth moistened with water may be used to clean batteries. Other cleaning tools, liquids or sprays will result in the build-up of an electrostatic charge or damage to the barrier or casing of the battery.

Rules for special work:

Work on batteries or within the safety distance using welding or soldering equipment, grinding machines or comparable tools may only be carried out by personnel who have been expressly informed of the potential dangers involved [25].

The following rules must also be observed:

- Attention must be paid to the range of flying sparks;
- Batteries must be disconnected from chargers before carrying out such work;
- The potentially explosive gas mixture in closed cells or block batteries must be removed from the head areas of the cells with a stream of compressed air, gaseous nitrogen or a similar inert gas [25].

Rules for transport:

The regulations of the ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road/Rail) apply to the transport of batteries.

Exception: Batteries are not subject to the provisions of the ADR if they are transported in accordance with special provision 598.

In order for batteries to be transported in accordance with special provision 598, each battery must:

- be clean;
- its casing must be in perfect condition;
- Additionally, it must be secured against short circuit.

New batteries must also be:

- secured against slipping, falling over and damage;
- provided with carrying devices, unless they are stacked on pallets, for example;
- they must not show any dangerous traces of alkalis or acids on the outside.

For used¹⁴² batteries the following also applies:

- they must be secured against leakage, slipping, falling over and damage, e.g. stacked on pallets;
- they must not show any dangerous traces of alkalis or acids on the outside.

¹⁴¹ For sealed batteries ≤ 2000 kg and gas-tight batteries ≤ 3000 kg in battery rooms, a conductive floor is not required. Instead of a conductive floor, an ESD wrist strap with a resistance of 1 MΩ is used.

¹⁴² Used batteries are those which, after normal use, are transported for recycling purposes.

Personnel requirement:

Work	Competence
Live work 1 Battery voltage < 60 V DC	Instructed persons (electrically)
Live work 1 Battery voltage > 60 V DC	Skilled person with special training and qualification
Live working 2 Battery voltage > 60 V DC	2 x skilled persons with special training and qualification, one as supervisor (ArV)
Maintenance	Skilled person with special training and qualification
Cleaning	Instructed persons with special training and qualification

Table R4.1.3.2 Personnel requirement for work on battery installations

NOTE: The point of disconnection between NIV and NEV is the connecting lug (see figure). These connecting lugs are considered the point of disconnection to the conductor run in from outside [1001].

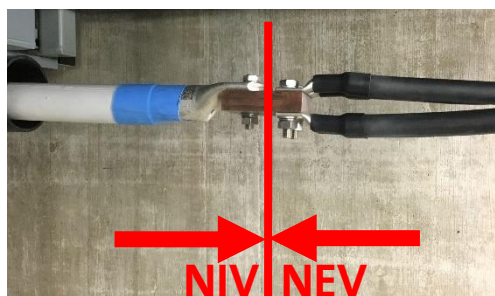


Figure R4.1.3.2: Boundary NIV-NEV

Rules

for work in the vicinity of electrical installations

R4.1.6a Work on telecommunications installations < 60 V DC

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. Whenever possible, electrical installations must be isolated according to the five safety rules before work is carried out on them.



Disconnect, and disconnect on all sides



Secure against re-connection



Verify absence of operating voltage



Earthing and short-circuiting



Protection against adjacent live parts

For work under dry conditions on telecommunications installations with a continuous voltage below 30 V AC effective value, 42.4 V AC peak value or 60 V DC, no screen against electrical energy sources (dangerous shock current) is necessary. [26]

Personal protective devices (personal protective equipment against electrical hazards) must be used against electrical power sources (electrical arc) during work in accordance with section 3.3.

Classification of the power source 48 V DC

48 V DC circuits are classified as electrical power source class 1 (ES1) and power source class 3 (PS3).

Dangers:

- Unexpected external voltage
 - When working in the high voltage area (works, transformers, poles);
 - From low voltage installations, at any time on lines, cable sheaths and earthing;
 - From extra-low voltage installations;
 - From telecommunications installations with remote power feeding > 60 V DC with short-circuit disconnection such as remote power feeding ± 190 V DC;
 - During thunderstorms in the vicinity.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;

- Work is carried out under the direction of a nominated person in control of a work activity;
- Order post-processing by contractor;
- Examination of the documents by the person responsible¹⁴³;
- Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthings may be touched. Shafts and poles must be abandoned;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities;
- Work must always be carried out with insulated tools;
- When working on overhead lines, "sturdy shoes" with rubber soles (S3) are essential, contact with metal duct, earthed metal parts of aerial cables and metal conductors must be avoided, if possible cover up to protect against contact;
- When working in copper sleeves, always assume that there are live conductors in the sleeve;
- When working under voltage or in the vicinity of live parts, the appropriate PPE-E (A3.3.2.1d) must be used.

Personnel requirement:

Installation	Work	Competence
Telecommunications installations < 60 V DC Tertiary supply	Installation as per StV Installation as per StV	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)
Telecommunications installations < 60 V DC Primary and secondary supply	Installation as per StV	<ul style="list-style-type: none"> • Skilled person for low and extra-low voltage
Telecommunications installations < 60 V DC Primary and secondary supply	Dead working	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)¹⁴⁴
Telecommunications installations < 60 V DC Tertiary supply	Work in the vicinity of live parts	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)¹⁴⁴
Telecommunications installations < 60 V DC Primary and secondary supply	Work in the vicinity of live parts	<ul style="list-style-type: none"> • Skilled person (electrically)
Telecommunications installations < 60 V DC Tertiary supply	Live working	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)¹⁴⁴
Telecommunications installations < 60 V DC Primary and secondary supply	Live working	<ul style="list-style-type: none"> • Skilled person (electrically)

Table R4.1.6a: Personnel requirement for work on telecommunications installations < 60 V DC

¹⁴³ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.

¹⁴⁴ (SC) The activity-specific instruction must be repeated at least once a year.

Rules

for work in the vicinity of electrical installations

R4.1.6b Work on telecommunications installations > 60 V DC

Activities in the vicinity or live working zone of electrical installations are always associated with increased risks and are therefore limited to absolutely necessary cases. Whenever possible, electrical installations must be isolated according to the five safety rules before work is carried out on them.



Disconnect, and disconnect on all sides



Secure against re-connection



Verify absence of operating voltage



Earthing and short-circuiting



Protection against adjacent live parts

Protective devices against sources of electrical energy (dangerous body current) and against sources of electrical power must be used for this work. [26]

Personal protective devices (personal protective equipment against electrical hazards) must be used against electrical power sources (electrical arc) during work in accordance with section 3.3.

Classification of the power source ± 190 V DC

± 190 V DC circuits are classified as electrical power source class 3 (ES3) and power source class 2 (PS2).

Examples:

- Remote power feeding (mCan/VmRRU) ± 190 V DC.

Dangers:

- Unexpected external voltage
 - When working in the high voltage area (works, transformers, poles);
 - From low voltage installations, at any time on lines, cable sheaths and earthing;
 - From extra-low voltage installations;
 - During thunderstorms in the vicinity.

Rules:

- For all work activity: In case of danger, say “STOP”!
- Work within the scope of this electrical safety concept is always carried out in accordance with the provisions listed in section 2.5.2:
 - Written or verbal order from Swisscom AG is required;
 - Risk assessment by contractors (Appendix A2.5.3);
 - Permit for the work (formal approval) from person responsible for an electrical installation;
 - Permit for the work (authorisation) from the nominated person in control of an electrical installation during work activities;

- Work is carried out under the direction of a nominated person in control of a work activity;
- Order post-processing by contractor;
- Examination of the documents by the person responsible¹⁴⁵;
- Finalise order.
- During thunderstorms in the vicinity < 2 km, no more lines, cable sheaths and earthing may be touched. Shafts and poles must be abandoned;
- Work may only be carried out after authorisation has been granted by the nominated person in control of an electrical installation during work activities;
- Work must always be carried out with insulated tools;
- Live working or working in the vicinity of live parts must always be done with at least Class 00 (500 V) insulating glove protection.
 - For Class 3 power sources, use the appropriate PPE-E (A3.3.2) when doing live work or working near live parts;
- When working on overhead lines, "sturdy shoes" with rubber soles (S3) are essential, contact with metal duct, earthed metal parts of aerial cables and metal conductors must be avoided, if possible cover up to protect against contact;
- When working in copper sleeves, always assume that there are live conductors in the sleeve.

Notes

Remote power feeding ± 190 V DC:

- In the Information system line card index ("ISLK"), the lines are marked "Remotepower";
- In the main distribution frame (MDF) of transmission points, Remote Power Feeding ± 190 V DC is recognisable by the colour coding (orange) (terminal strips on equipment side and transfer wires).
- Touching a bare wire (a or b) generates a residual current against the earthing system. The remote power feeding is switched off within 4 ms
WARNING: The remote power feeding often switches on again automatically!

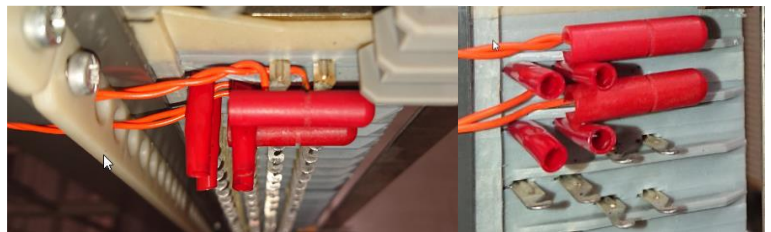


Figure R4.1.6b1: Solder lugs with orange insulating sleeve

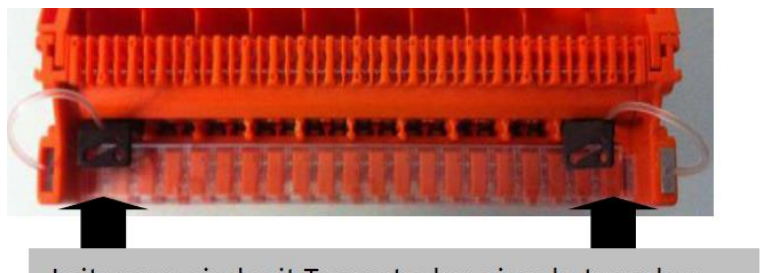


Figure R4.1.6b2: Dividing strip

¹⁴⁵ This information can be found in section 2.1.1 and in the personnel assignment list of the object group- or object-specific electrical safety concept.


- If the two cable wires (a/b) of a supply are touched simultaneously with one hand, an electric shock is felt.
To avoid touching the bare soldering points on the main distribution frame (MDF) as well as on the VT, the soldering lugs are insulated with orange insulating tube;
- In the case of splicing work, before work begins, it must be checked in the ISLK which lines are "remote power". The lines must be disconnected during the work in the main distribution frame (MDF, orange safety edge) and labelled with a warning sign. These two measures secure against re-connection.



Figure R4.1.6b3:
Switching prohibited

Personnel requirement:

Installation	Work	Competence
Telecommunications installations > 60 V DC Tertiary supply	Installation as per StV	<ul style="list-style-type: none"> • Skilled person or • Instructed persons (electrically)
Telecommunications installations > 60 V DC Primary and secondary supply	Installation as per StV	<ul style="list-style-type: none"> • Skilled person for low and extra-low voltage
Telecommunications installations > 60 V DC Primary and secondary supply	Dead working	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training • Instructed persons with Remote Power Feeding training¹⁴⁶
Telecommunications installations > 60 V DC Tertiary supply	Work in the vicinity of live parts	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training • Instructed persons with Remote Power Feeding training¹⁴⁶
Telecommunications installations > 60 V DC Primary and secondary supply	Work in the vicinity of live parts	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training
Telecommunications installations > 60 V DC Primary and secondary supply	Live work Voltage 1	<ul style="list-style-type: none"> • Skilled person with Remote Power Feeding training • Instructed persons with Remote Power Feeding training¹⁴⁶

¹⁴⁶  The activity-specific instruction must be repeated at least once a year.

Installation	Work	Competence
Telecommunications installations > 60 V DC Primary and secondary supply	Live work Voltage 2	<ul style="list-style-type: none"> Prohibited

Table R4.1.6b: Personnel requirement for work on telecommunications installations > 60 V DC

Rules

for work in the vicinity of electrical installations

R4.1.7 Use and operation of electrical installations and equipment by ordinary persons

The use and operation of electrical installations and equipment is always associated with a risk of electric current and electrical arcs. The following rules must be applied in order to reduce the hazards for ordinary persons and property to a minimum.

Rules:

- Rooms, cabinets and equipment which are marked with a warning sign with a lightning arrow or battery symbol or with the prohibition of access sign must not be opened or entered by ordinary persons. If necessary, contact your supervisor or the building-specific contact person for electrical installations.



Figure R4.1.7.1:
Warning sign -
lightning bolt symbol
electricity hazard



Figure R4.1.7.2:
Warning sign -
battery charging
symbol



Figure R4.1.7.3:
Prohibition sign - no
access for
unauthorised persons

- Electrical installations and equipment may only be used if they are in a safe condition:
 - Staff must inspect electrical installations and equipment that they are in good condition before use. The following points must be checked visually:
 - Housing in original condition, no cracks or broken off parts;
 - Cables have no cuts, crimps or other damages;
 - Plugs and couplings are in original condition, no "torn out" cables on plugs or sockets, no cracks, broken or cut off parts;
 - Defective sockets, switches, cables and equipment must not be used. Report defects to your supervisor or the property-specific contact person for the electrical installations;
- Switches and control devices may only be operated if they are intended for normal use;
- When using plugs, always hold them by the handle, never pull on the cable or touch the bare pins,

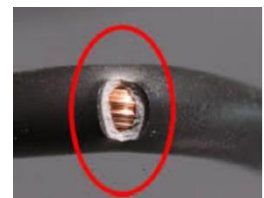


Figure R4.1.7.4:
Example of defective cable



Figure R4.1.7.5:
Example of defective barrier
and plug

- Lay extension and connection cables in such a way that there is no risk of tripping;
- Cable reels must always be unrolled completely, otherwise the rolled-up cable may overheat;
- No more than two power strips or double plugs may be connected in series;
- It is not permitted to stack double plugs. It is better to use one socket strip;
- Adapter plugs (except for fixed adapters) and/or travel adapters must not be used;
- Special care must be taken in wet or damp conditions around electrical installations and equipment; use is then only permitted with a residual current device. If in doubt, use a mobile residual current device;
- Decentralised residual-current-operated protective devices such as socket-outlet residual current devices, mobile residual current devices, residual current devices in local socket distributors (e.g. hard rubber distributors), residual current devices for overhead contact lines and residual current devices for service sockets (fire alarm, lift, gas detection, air conditioning and sanitary, etc.) are tested "every working day". This means that the user is obliged to inspect the residual current protection before use.
- Electrical equipment brought to the work location itself may only be used under supervision. The responsibility for safety lies with the person who brought the equipment. Swisscom AG accepts no liability for personal injury or damage to property caused by private equipment;
- **Important:** in the event of imminent danger, the electrical installation or the equipment must:
 - be taken out of service and
 - withdrawn from further use until the defect has been completely eliminated;
- Sockets for telecommunications and IT equipment in data centres and transmission points are intended exclusively for the relevant equipment; any use for other equipment is not permitted;
- Accidents or near misses involving electricity must be reported immediately to the emergency number Swisscom **0800 88 00 88**. When rescuing a patient, follow the rules R2.8 Emergency arrangements and R2.8.4 First aid for electrical accidents.



Figure R4.1.7.6:
Example of mobile residual
current protection