

## BUSINESS PLAN

CENELEC/TC or SC TC121A	Secretariat France	Date 2022-12-02
----------------------------	-----------------------	--------------------

**TC or SC title:** Low-voltage switchgear and controlgear

### A Background

The scope of CLC TC121A is to establish and maintain harmonized standards for low-voltage switchgear and controlgear (up to 1 kV a.c. or 1,5 kV d.c.), based on concluded international standards (prepared by IEC SC121A).

CLC TC121A covers all features of low-voltage switchgear and controlgear:

- Product requirements (characteristics, product information, normal service, mounting and transport conditions, constructional and performance requirements, environmental and safety requirements...) and the associated test requirements;
- Physical and logical interfaces to the control system (controller-device interfaces and device profiles).
- Product data and properties for information exchange

CLC TC121A considers the horizontal topics that impact low-voltage switchgear and controlgear and also contributes to the improvement of the associated horizontal standards, in particular the following topics:

- Energy efficiency;
- Environmental aspects;
- Safety (including functional safety);
- Electromagnetic compatibility (EMC);
- Radio communication functions.

- Topics covered by product standards:

### Power circuit equipment

General rules for Low-voltage switchgear and controlgear	<b>EN 60947-1</b>
Circuit-breakers (air circuit-breakers, moulded-case circuit-breakers) with the exception of miniature circuit-breakers which are in the scope of CLC SR23E "Circuit-breakers and similar equipment for household use"	<b>EN 60947-2</b>
Switches, disconnectors, switch-disconnectors, fuse-combination units and similar equipment	<b>EN 60947-3</b>
Electromechanical contactors, overload relays, motor-starters and similar equipment, including electromechanical contactors for household and similar purposes. It covers electronic relays with extended functions that may also be called in the field with other designation such as: "motor management system", "motor protector"...	<b>EN 60947-4-1</b>
AC semiconductor motor controllers and starters	<b>EN 60947-4-2</b>
AC semiconductor controllers and contactors for non-motor loads	<b>EN 60947-4-3</b>
Multiple function equipment: <ul style="list-style-type: none"> <li>• Transfer switching equipment, except for static transfer systems</li> </ul>	<b>EN 60947-6-1</b>

<p>which are in the scope of CLC SR22H "Uninterruptible power systems (UPS)";</p> <ul style="list-style-type: none"> <li>Control and protective switching devices (or equipment) (CPS).</li> </ul> <p>Control units for built-in thermal protection (PTC) for rotating electrical machines</p> <p>Arc-quenching device</p> <p>Internal Arc Control Device (project)</p> <p>Semiconductor Circuit-Breakers</p> <p>Electromechanical contactors for household and similar purposes</p>	<p><b>EN 60947-6-2</b></p> <p><b>EN 60947-8</b></p> <p><b>EN 60947-9-1</b></p> <p><b>EN 60947-9-2</b></p> <p><b>EN 60947-10</b></p> <p><b>EN 61095</b></p>
--	--

### Control circuit devices and switching elements

Electromechanical control circuit devices (e.g. push-buttons, position switches, foot switches, indicators lights, auxiliary contacts)	<b>EN 60947-5-1</b>
Proximity switches (including proximity switches with defined behaviour under fault conditions -PDDB-)	<b>EN 60947-5-2</b> <b>EN 60947-5-3</b>
Method of assessing the performance of low-energy contacts - Special tests	<b>EN 60947-5-4</b>
Electrical emergency stop device with mechanical latching function	<b>EN 60947-5-5</b>
DC interface for proximity sensors and switching amplifiers (NAMUR)	<b>EN 60947-5-6</b>
Requirements for proximity devices with analogue output	<b>EN 60947-5-7</b>
Three-position enabling switches	<b>EN 60947-5-8</b>
Flow-rate switches	<b>EN 60947-5-9</b>
Low-voltage switchgear and controlgear - Control switches - Position switches 42,5×80 - Dimensions and characteristics	<b>EN 50041</b>
Low-voltage switchgear and controlgear - Control switches - Position switches 30×55 - Dimensions and characteristics	<b>EN 50047</b>

### Terminal blocks

Terminal blocks for copper conductors	<b>EN 60947-7-1</b>
Protective conductor terminal blocks for copper conductors	<b>EN 60947-7-2</b>
Safety requirements for fuse terminal blocks	<b>EN 60947-7-3</b>
PCB terminal blocks for copper conductors	<b>EN 60947-7-4</b>

### Clamping units (Safety group function standard)

Safety requirements for screw-type and screwless-type clamping units for conductors above 35 mm <sup>2</sup> up to 300 mm <sup>2</sup>	<b>EN 60999-2</b>
--	-------------------

## Mounting rail (Horizontal standard)

Dimensions of low-voltage switchgear and controlgear - Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories	<b>EN 60715</b>
---	-----------------

- Topics covered by standards for specific application:

## Application specific equipment

Enclosed switch outside the scope of IEC 60947-3 for various applications, to provide isolation of electrical equipment during repair and maintenance work	<b>EN 62626-1</b>
--	-------------------

- Topics covered by standards for interface:

## Controller-device interfaces (CDIs)

General rules	<b>EN 62026-1</b>
Actuator sensor interface (AS-i)	<b>EN 62026-2</b>
DeviceNet	<b>EN 62026-3</b>
CompoNet	<b>EN 62026-7</b>

## Device profiles for networked industrial devices

General rules for the development of device profiles	<b>EN 61915-1</b>
Root device profiles for starters and similar equipment	<b>EN 61915-2</b>

## B Business Environment

### B.1 General

As conformity to CE marking is mandatory for most of the systems integrating CLC TC121A products, development of related EN standards are mandatory too. This allows guaranteeing conformity of CLC TC121A products to main EU Directives, as for example:

- (Recasted) Low-Voltage Directive (2014/35/EU),
- (Recasted) EMC Directive (2014/30/EU),
- Radio Equipment Directive (2014/53/EU), and
- Machinery Directive (2006/42/EC).

CLC TC121A works also improve SMEs productivity by offering high-quality widely-recognized switchgears and controlgears, tested once, accepted everywhere.

The global engineering market within EU28 is estimated at 2076 b€ (2017 figures). However, EU growth remains weak regarding other emerging countries (e.g. Asia or South America). Nevertheless, the low-voltage switchgear and controlgear industry employ more than 100 000 people.

### B.2 Market demand

Customers of CLC TC121A products standards are more and more requesting for widely-approved products, and CE-marking is an essential minimum requirement for offer contracting.

The EN standards published by CLC TC121A are a reference for example to:

- low-voltage switchgear and controlgear manufacturers;
- test houses when processing certification;
- panel builders;
- electricians;
- contractors (in addition to the installation standards, the switchgear standards allow to reach a better electrical safety) and;
- other users of the products (like electrical utilities and major industrial actors).

### **B.3 Trends in technology**

The development of mechanical switching devices has been rather stable in the past, which has made it possible to describe and verify the functionality rather good for these devices.

Electronic and semiconductor technologies have both created new devices and hybrid devices (combining mechanical, electronic and semiconductor technologies). These new technologies bring new functionality and behaviour to the products and improved ability for communication, therefore increasing significantly contribution of TC121A products to some EU initiatives (e.g. Industry 4.0).

The on-going integration of CLC TC121A products in energy management systems induces development of mechatronic devices, meaning that Embedded Electronics and Software gained more and more values for customers. Hence, standards dedicated to data communication and transfers, as well as device profiles, will continue to be developed to cover these needs.

### **B.4 Market trends**

The everlasting demand of cost reduction leads to two divergent tendencies:

- the standardization of the devices bringing cost reduction through high volume;
- the optimisation of the devices adapted to the environment.

The increased demand for reliability is clearly pushing the standardization because high volume creates possibilities for:

- more efficient quality monitoring;
- more engineering improvements.

The need for availability and standardization of devices for machine manufacturers and their end-users customers is confirmed.

The e-commerce heightens the interest in exchange in electronic format of data describing products through a defined structure for the information.

The continuous need to increase of efficiency pushes the market of electronic intelligence capable of providing more information to the monitoring and control systems.

Finally, some new applications on power generation (e.g. photovoltaic) have also an impact on customer requirements and will be considered by CLC TC121A.

Smart products and data exchange are becoming more and more important in the context of digitization. It is expected that wireless communication will be an essential requirement for many TC121A products in the medium term. Compliance with RED will be the legal basis for these products.

### **B.5 Ecological environment**

CLC TC121A is taking into account works on horizontal rules and recommendations done by CLC TC111X. CLC TC121A standards are also specifying additional requirements specific to their product portfolio in the following areas:

- Eco-design (environmental-conscious design);
- resource efficiency (energy efficiency, material efficiency);
- pollution/emission (hazardous substances).

CLC TC121A products are key devices in energy management and have no significant contribution to energy losses in electrical networks compared to the driven loads. CLC TC121A is improving its capability to follow the evolution of EU regulation that may impact the low-

voltage switchgear and controlgear, as for example the European Regulation "Ecodesign for energy-using products" (2009/125/EC).

#### **B.6 Involvement of societal stakeholders**

The customers of CLC TC121A product standards are represented by members of CLC SR121B, which integrates most of CLC TC121A devices and products. Nevertheless, CLC TC121A is willing to increase membership of energy suppliers and power utilities.

#### **B.7 Involvement of SMEs**

Even if SMEs are taking many benefits of CLC TC121A works, no-one are involved up to now in CLC TC121A, but some are acting at NC-level.

### **C System approach aspects**

CLC TC121A, as a component supplier for many systems, is linked to many other committees.

It is crucial to harmonize the requirements coming from all these different applications.

That is why CLC TC121A is in favour of a few well-implemented horizontal standards and group safety standards.

The following table identify:

- system committees for which CLC TC121A is supplier of (our product is part of their system);
- component committees for which CLC TC121A is customer to (their product is part of our system);
- other Committees.

Note: some TCs (or SCs/SRs) appear twice in the spreadsheet below, because CLC TC121A has several types of relationship with these TCs (or SCs/SRs). E.g. SR22G is a system committee for CLC TC121A because contactors are used in PDS, and also an interacting/partner committee, because included in the same industrial control systems.

### List of TC121A interactions with other TCs

TC121A	Committee	Description
Component committees (CLC TC121A - role of a customer)	SR 32B	Low-voltage fuses
	SR 32C	Miniature fuses
	SR 94	All-or-nothing electrical relays
System committees (CLC TC121A - role of a supplier)	SR 121B	Low-voltage switchgear and controlgear assemblies
	TC 18X	Electrical installations of ships and of mobile and fixed offshore units
	TC 22X	Power electronics
	TC 44X	Safety of machinery - Electrotechnical aspects
	TC 64	Electrical installations and protection against electric shock
	TC 65X	Industrial-process measurement, control and automation
	TC 82	Solar photovoltaic energy systems
	SR LVDC	Low Voltage Direct Current and Low Voltage Direct Current for Electricity Access
Other committees (interacting/partner committees, committees providing generic guidance or horizontal standards, boundary committees, etc.)	TC 2	Rotating machinery
	SR 3	Information structures, documentation and graphical symbols
	SR 3C	Graphical symbols for use on equipment
	TC 22X <sup>1</sup>	Power electronics
	TC 23E	Circuit-breakers and similar devices for household and similar applications
	TC 31	Electrical apparatus for potentially explosive atmospheres
	SR 32B	Low-voltage fuses
	TC 34	Lighting
	TC 44X	Safety of machinery - Electrotechnical aspects
	TC 65X	Industrial-process measurement, control and automation
	TC 76 <sup>1</sup>	Optical radiation safety and laser equipment
	TC 85X	Measuring equipment for electrical and electromagnetic quantities
	SR 89	Fire hazard testing
	SR 94	All-or-nothing electrical relays
	SR 109	Insulation co-ordination for low-voltage equipment
	TC 111X	Environment
SR 112	Evaluation and qualification of electrical insulating materials and systems	
TC 210	Electromagnetic Compatibility (EMC)	

<sup>1</sup> Liaison established.

#### D Objectives and strategies (3 to 5 years)

To keep the CLC TC121A standards portfolio updated, because of the impact of:

- new technologies (e.g. semiconductor technology instead of electromechanical);
- new requirements (e.g. safety, environmental conscious design, energy efficiency).

To provide new EN standards for new products based on new technologies and that:

- improve the safety;
- improve the sustainability (environmental conscious design and energy efficiency).

To provide new EN standards to simplify business:

- simplify the integration of CLC TC121A devices into systems (e.g. communication, device profiles);
- simplify the e-commerce (e.g. product properties).

To draft and publish EN homegrown amendments to IEC-originated publications intended to cover specific requirements (arising e.g. from RED):

- principle to be first validated on EN 60947-5-2/A11:2022
- extension to other product standards forecasted in a second wave (prEN IEC 60947-5-1:2023/prAA).

To create standards that cover all necessary aspects and that are recognized and applied within EU.

<b>Objectives</b>		<b>Strategy</b>
<b>Simplify the business</b>		
	Simplify interoperability	To publish EN standards on device profiles
	Facilitate e-commerce	To publish EN standards on product classification and properties
	Ease listing of TC 121A publications under various directives	To publish EN-homegrown amendments when IEC publications kept unchanged
	Increase the application of the CLC TC121A standards worldwide	To continue the EN/IEC harmonization projects with UL To involve all regions of the world in the EN-IEC 121A work program
<b>Reduce the harm on environment</b>		
	Increase the energy efficiency	To participate to join working groups with system committees, including smart energy
	To accelerate environmental conscious design	To apply at the full extent possible the outcome of TC 111X
<b>Provide standards for new products</b>		
	To maintain the appropriate safety level	To use basic safety standards and group safety standards, especially FS standards (e.g. EN 61508)

## **E Action plan**

CLC TC121A has a plenary meeting at least every year depending on the actions and results of activities, where the long-term and medium-term actions are decided.

Working Group 3 meets two or three times a year.

Description	Time-limit
To fix all current issues regarding EMCD, LVD, MD and RED listings of CLC TC121A portfolio	<b>On-going</b>
To draft and ratify new amendment A11 for EN 60947-5-1 aimed to follow the proposed method for RED listing	<b>2024</b>
To have upper document listed under RED in OJEU	<b>2024</b>

**F Useful links to CENELEC web site**

[Link to CLC TC121A Homepage](#)

Michaël Laheurte, Secretary of CLC TC121A