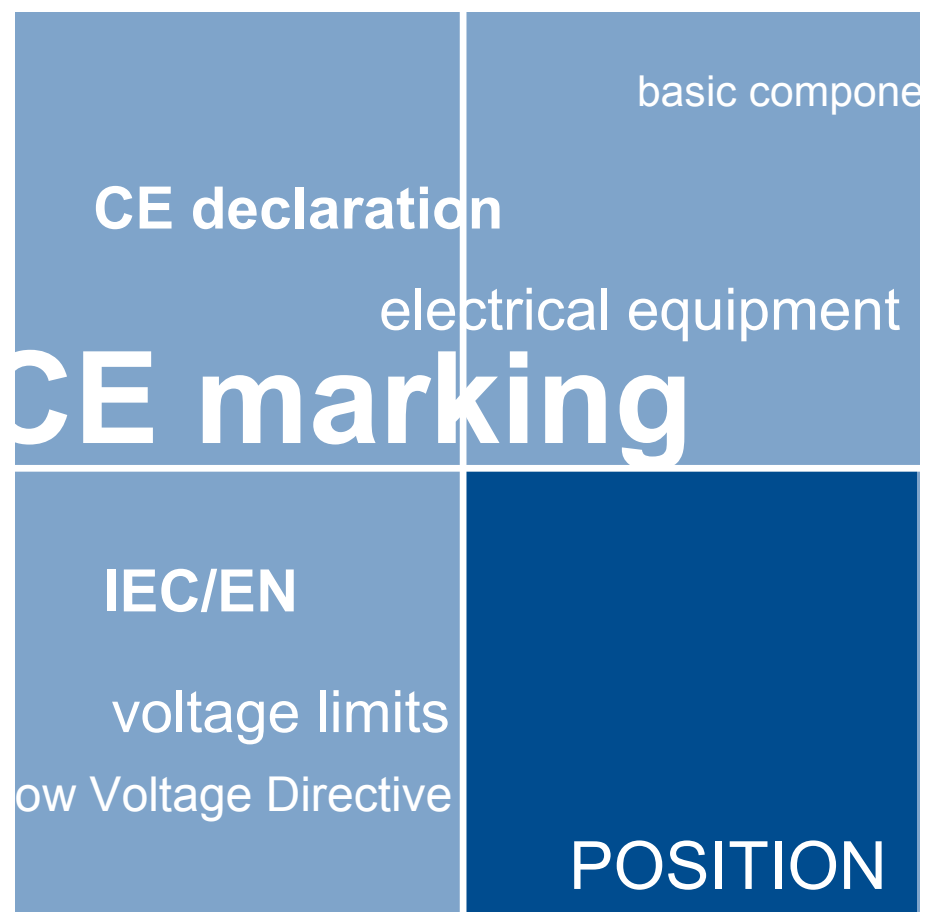


Position Paper

Treatment of Electromechanical Elementary Relays

according to IEC/EN 61810-1
in regard to the
Low Voltage Directive 2014/35/EU [1]



March 2018

Treatment of Electromechanical Elementary Relays according to IEC/EN 61810-1 in regard to the Low Voltage Directive 2014/35/EU [I]

Uncertainty remains in the European domestic market about when elementary relays (electromechanical elementary relay) according to IEC/EN 61810-1[II] require CE marking in regards to the Low Voltage Directive 2014/35/EU.

The CE marking must always be affixed whenever a product is registered by at least one EU legal act requiring CE marking for that product. It then indicates that the requirements of all legal acts applicable to the product are fulfilled.

With this position paper, ZVEI posits a long acknowledged position¹ for classifying elementary relays especially in regard to the Low Voltage Directive which will continue to apply unchanged even after its recast of 2014.

Because elementary relays² are classified as **basic components**, whose safety cannot be assessed for its own, the Low Voltage Directive is generally **not** applicable.

Nevertheless, there are grey areas for certain products that must be considered separately. In either case, one must remember that the CE marking is **either required** when the product falls under a corresponding EU

directive, **or it is forbidden** if this is not the case.

The member companies of ZVEI take the following position.

Legal background

In essence, the Low Voltage Directive basically covers "electrical equipment" for voltages between 50 V and 1,000 V AC or 75 V and 1,500 V DC. For such equipment, the Low Voltage Directive mandates a CE declaration by the manufacturer and the CE marking according to Articles 8 and 10 as well as Annex III. However, **basic components** are not considered electrical equipment by this directive and therefore **do not fall within the scope of the directive**.

In its guideline to the Low Voltage Directive [III], the EU commission defines such excluded **basic components, to which elementary relays belong**. According to section 9, paragraph 3 of this guideline, such components are those whose "safety to a very large extent depends on how they are integrated into the final product and the overall characteristics of the final product".

The accompanying footnote 13 of the guideline specifically lists "relays with terminals for printed circuit boards" as an example.

However, special circumstances can lead to the presence of safety-related assessable features, which then result in compliance with the Low Voltage Directive and compulsory CE marking.

¹ Applying EC directives to all-or-nothing relays (status: November 2016)

² Electromechanical elementary relays are all-or-nothing relays that operate and release without an intentional time delay" [IEC/EN 61810-1, sect. 3.2.3; IEC 444-01-03, corr.]. This term was introduced to distinguish these relays from "all-or-nothing relays", since the latter term is broadly used (all-or-nothing relays include elementary relays and specified-time relays).

Technical background

The following groups can be distinguished from one another:

1 Elementary relays for printed circuit boards:

For the most part, safety can only be determined after the component has been mounted in the final product. For elementary relays destined to be mounted on printed circuit boards, live-part protection is missing, for example, which is a major safety feature (Low Voltage Directive Annex I, paragraph 2a). Live part protection only becomes necessary after the elementary relay has been mounted in the final application. For this reason, according to the guideline, **elementary relays are basic components** that are not subject to the Low Voltage Directive.

→ **No CE marking** according to the Low Voltage Directive

Many elementary relays in electronic and data technology are intended for use under 50 V AC and 75 V DC. For such products, the Low Voltage Directive generally does not apply³:

→ **No CE marking** according to the Low Voltage Directive

2 Elementary relays mounted on sockets:

With such a combination, one must generally recognize that the socket can only be used with the corresponding elementary relay as specified by the manufacturer^{4/5}.

³ If the lower voltage limits become invalid in the Low Voltage Directive at some point in the future, the aforementioned conditions will still apply.

⁴ Some sockets can accommodate elementary relays of various manufacturers (terminal configuration is the same, but not necessarily the same number of terminals on the elementary relay or jacks in the socket). With an arbitrary combination, the function of the combination is in danger, e.g. the plug connection may be exposed to too much heat, and the required level of safety cannot be guaranteed. Therefore, approved combinations serve as basis for the analysis by the

2.1 Elementary relays mounted on sockets not intended to be mounted directly in an installation, but rather to be soldered on printed circuit boards or to be mounted in enclosed devices:

The sockets are usually equipped with soldering pins, solder lugs or “Gull-Wing” terminals for example. Regarding safety evaluation, these products are treated the same as those under point 1.

→ **No CE marking** according to the Low Voltage Directive

2.2 Elementary relays mounted on sockets intended for direct mounting in an installation, e.g. with screw terminals, flat quick-connect terminals or “push-in” terminals:

Such relays are considered self-contained equipment in an electrical installation and therefore feature the necessary assessable safety characteristics.

→ **CE marking requirement** according to the Low Voltage Directive; **CE marking on the socket^{5/6}** (if the Low Voltage Directive's voltage limits are fulfilled).

3 Elementary relays intended for direct mounting in an installation, e.g. with screw terminals, flat quick-connect terminals or cutting clamp terminals^{5/6}:

→ **CE marking requirement** according to the

manufacturer, and CE marking must be based upon this.

⁵ In many cases, elementary relays that can be used in combination with a certain socket can be used without the socket, which relegates them to group 1. If the CE marking is required for a combination with a socket, then it applies to the combination and must appear on the socket.

⁶ The CE marking requirement is covered in the GUIDELINES ON THE APPLICATION OF DIRECTIVE 2014/35/EU, section 9, paragraph 5 (“elements of electrical installation”). The application must provide for live-part protection (Low Voltage Directive Annex I, paragraph 2a). Requirements are described, for example, for the scope of EN 50178 [IV], section 5.2.4 and figure 3/iii. EN 61140 [V] provides basic information in sections 5.1.2 and 5.1.3.

Low Voltage Directive; CE marking on the connection piece^{4/5} (if the Low Voltage Directive's voltage limits are fulfilled).

Sources

- [I] Directive 2014/35/EU of the European parliament and commission from 20th April 2016 to harmonize the legal requirements of the member states in regards to using electric equipment within certain voltage limits (a.k.a. the Low Voltage Directive, whose content is the same as the earlier directive 73/23/EC in connection with 93/68/EEC, 2006/35/EU).
- [II] IEC/EN 61810-1; Electromechanical elementary relays – Part 1: General and safety requirements
- [III] GUIDELINES ON THE APPLICATION OF DIRECTIVE 2014/35/EU (ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS). Underlying English version of November 2016.
- [IV] EN 50178; Electronic equipment for use in power installations
- [V] IEC/EN 61140; Protection against electric shock – Common aspects for installation and equipment

The following examples illustrate this

Group	Type	CE acc. to 2014/35/EU
1	<p data-bbox="379 454 1169 488">Elementary relays with solder pins / printed circuit board mouting</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="405 573 676 1021"> </div> <div data-bbox="871 654 1182 981"> </div> </div>	<p data-bbox="1318 763 1370 797">no</p>
2.1	<p data-bbox="312 1126 1236 1160">Elementary relays with solder pins / solder lugs and sockets with solder pins</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="389 1227 695 1738"> </div> <div data-bbox="912 1258 1139 1729"> </div> </div>	<p data-bbox="1318 1435 1370 1469">no</p>

2.2	Elementary relays with solder terminals / solder lugs and socket with screw connection / „push-in“ terminals / flat quick-connected terminals		yes
			
3	Elementary relays with screw terminals / flat quick-connected terminals		yes
			



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