Safe separation in the power supply

of areas used for medical purposes

DIN VDE 0100-710 (VDE 0100-710):2012-10 in section 710.536.101 'Devices for disconnecting and switching' requires reliable isolation between the systems for areas used for medical purposes and automatic transfer switching devices installed there.

The standard HD 60364-7-710:2012 requires 'Automatic change-over devices shall be arranged so that safe separation between supply-lines is maintained. 'An almost identical requirement can also be found in IEC 60364-7-710:2021 in section 710.536.101: 'The automatic transfer switching or automatic change-over equipment shall be arranged so that safe separation between supply-lines is maintained.'

Misunderstandings and ambiguities often arise in connection with the term reliable or safe separation. The following information serves to clarify the meaning of the term 'separation' in the understanding of the standard in order to provide assistance in the selection of standard-compliant changeover devices.

The term 'separate'

In DIN VDE standards

The term separation in connection with switching devices is defined in DIN VDE 0100-530 (VDE 0100-530):2018-06 'Installation of low-voltage systems – Part 530: Selection and installation of electrical equipment – switching and control devices'.

> **530.3.2 Separate**
> Function intended to interrupt the power supply to all sections or a single section of the electrical installation for safety reasons by disconnecting the electrical installation or its sections from any source of electrical power.
> [Source: DIN VDE 0100-200 (VDE 0100-200):2006-06; 826-17-01].[1]

Section 537 describes the requirements for separation properties as follows:

> **537.2 Devices for separating**
> 537.2.1 Isolating devices shall be specifically identified in the applicable product standard for the isolating function.
> Devices with separation properties must be selected in accordance with Annex B .
>
> **537.2.2 Semiconductors must not be used for separation.**
>
> 537.2.3 Devices with isolating properties must be selected for the overvoltage category of their installation location.
> **Only devices that are classified for overvoltage category III or IV may be used for disconnection,** with the exception of plug-in devices that are shown in Table B.1 with disconnection properties.
>
> **Note:**
> Examples of overvoltage categories are contained in DIN VDE 0100-443 (VDE 0100-443).
> Devices with separating properties shall comply with 537.2.4 to 537.2.8.[2]

[1] DIN VDE 0100-530 (VDE 0100-530):2018-06

[2] ebd.

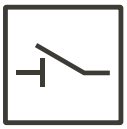
In IEC standards

The term 'insulation' is used here in connection with switchgear in the following standard:

IEC 60364-5-53
Low-voltage electrical installations – Part 5-53: Selection and erection of electrical equipment – Devices for protection for safety, isolation, switching, control and monitoring

> **536.2 Isolation**
> 536.2.1 General
> 536.2.1.1 Every circuit shall be capable of being isolated from all live conductors. Provisions may be made for isolation of a group of circuits by a common means, if the service conditions allow this. Each supply shall have a means of isolation.[3]

Section 536.2.2 describes the **requirements for the separation properties** as follows:

> **536.2.2 Devices for isolation**
> 536.2.2.1 Some devices suitable for isolation are identified with the symbol
>
> 
> (IEC 60417-6169-1:2012-08).
>
> This symbol may be combined with symbols for other functions. Devices **shall be selected according to overvoltage category III or IV** only, whichever is applicable for the point of installation. Devices used for isolation shall be selected from **Table E.1, Annex E**, and in accordance with 536.2.2.2 to 536.2.2.7.
> ...
>
> 536.2.2.3 **Semiconductor devices shall not be used** as isolating devices.[4]

[3] IEC 60364-5-53:2019

[4] ebd.

Further requirements for an automatic changeover device

In addition, HD 60364-7-710:2012 and IEC 60364-7-710:2021, chapter 710.536.101 require that automatic transfer switching devices must comply with EN or IEC 60947-6-1 and be suitable for disconnection.

The requirements for devices suitable for isolating functions are again set out in the standard IEC 60947-1:2020 German version DIN EN IEC 60947-1 (VDE 0660-100):2022-03 Low-voltage switchgear and controlgear – Part 1: General specifications defined.

These devices can be recognised by a symbol for isolating properties, with which these devices must be labelled.

for a switch disconnector.[5]

> **8.1.7 Additional requirements for devices suitable for isolating function**
> 8.1.7.1 Additional construction requirements
> In the **open position** (see 3.6.21), devices suitable for the isolating function must have an isolating distance corresponding to the requirements for the isolating function (see 8.2.3.2 and 8.2.7)
> The indication of the position of the **main contacts** must be provided by one or more of the following options:
>
> - the position of the control unit;
> - a separate mechanical indicator;
> - the visibility of all moving main contacts [5]

The explanation of the term 'open position' specifies that it is a mechanical switching device.

> **3.6.21 open position**
> **‹of a mechanical switching device›**
> Switching position in which the specified dielectric strength between the open contacts of the main circuit of the switching device is fulfilled.[6]

[5] DIN EN IEC 60947-1 (VDE 0660-100):2022-03

[6] ebd.

Conclusion

According to Annex B of DIN VDE 0100-530 (VDE 0100-530):2018-06 and Annex E of IEC 60364-5-53:2019, **safe disconnection cannot be achieved using a contactor**.

According to chapter 537.2.2 of DIN VDE 0100-530 (VDE 0100-530):2018-06 and chapter 536.2.2.3 of IEC 60364-5-53:2019, the use of **semiconductors** is **not permitted**.

In addition, DIN EN 60947-1 clearly states that devices suitable for disconnection must be mechanical switchgear.

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