5. Provide Protection against adjacent Live Parts – Insulating Protective Shutters

- Protection against accidental contact with live parts of installations with rated voltages from 1 to 36 kV
- Four different designs for use in almost all types of switchgear installations

According to the five safety rules, adjacent parts are parts situated in the vicinity zone. If parts of an installation near the work location cannot be disconnected, additional safety measures must be taken before starting work as is the case with work in the vicinity of live parts.

Insulating protective shutters according to DIN VDE 0682-522 are used to provide protection against accidental contact with live parts of an installation. They are portable and inserted under live conditions by hand or by using an operating stick.

Insulating protective shutters are designed for short-term use in indoor electrical installations according to DIN VDE 0101 with voltages from 1 to 36 kV a.c. at nominal frequencies below 100 Hz to provide protection against direct contact according to DIN VDE 0105-100 when working in the vicinity of live parts.

When used in medium-voltage installations, insulating protective shutters might have to be adapted, for example if it is not possible to insert shutters in the live working zone without risk due to unfavourably located drives, switch components or isolating plates. In such cases, a standard-compliant solution can be found by cutting out parts of the insulating protective shutter or cutting it to size. For that purpose, technical details must be provided. We have developed a special template for insulating protective shutters which can be used, for example, to mark the exact location of cut-outs.

For enquiries and orders, please fill in the template on pages 130 to 132 or visit our website www.dehn-international.com.
5. Provide Protection against adjacent Live Parts – Insulating Protective Shutters

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Minimum distance of the live part</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from shutter edge a</td>
<td>from shutter b</td>
</tr>
<tr>
<td>3.6 kV</td>
<td>60 mm</td>
<td>0 mm</td>
</tr>
<tr>
<td>7.2 kV</td>
<td>90 mm</td>
<td>0 mm</td>
</tr>
<tr>
<td>12.0 kV</td>
<td>120 mm</td>
<td>20 mm</td>
</tr>
<tr>
<td>24.0 kV</td>
<td>220 mm</td>
<td>60 mm</td>
</tr>
<tr>
<td>36.0 kV</td>
<td>320 mm</td>
<td>100 mm</td>
</tr>
</tbody>
</table>

*Example of a live working zone in case of an insulating protective shutter of type A1*

**Note**

Insulating protective shutters do not protect against re-connection. The protected area is the area which is separated from the area containing live parts by the insulating protective shutter. The minimum distances shown in the above table between shutters / shutter edges and live parts must be observed.

The protective part (with length $l_S$ and, if required, height $h_S$) of insulating protective shutters is the part that provides protection against accidental contact with live parts. It is fitted with either a handle or a coupling for attaching an operating stick.

Outside the live working zone, the following gaps are permissible between shutter edge and cell wall:

- Up to 10 mm without restriction
- Up to 40 mm, if the distance between the shutter edge and the live working zone is at least 100 mm
- Up to 100 mm near a switch subconstruction
Due to the various designs of switchgear installations, DIN VDE 0682-552 defines four different basic types of protective shutters:

A1, safety distance provides protection during inserting and removing insulating protective shutters
A2, protective section provides protection during inserting and removing insulating protective shutters
A3, operating stick provides protection during inserting and removing insulating protective shutters
A4, protective device installed in the installation provides protection during inserting and removing insulating protective shutters

1. Live working zone
2. Protected area
3. Protective section with length $l_3$ (and height $h_3$)
4. Limit mark or red ring
5. Guide mark / hand guard
6. Handle
7. Coupling
8. Insulating element of the operating stick with length $l_1$

- $l_0$: Total length of the operating stick
- $l_3$: Length of the top section of the operating stick
- $l_4$: Length of the handle of the operating stick
- $l_1$: Length of the insulating element of the operating stick
- $l_5$: Length of the protective section
- $l_6$: Safety distance

5. Provide Protection against adjacent Live Parts – Insulating Protective Shutters

<table>
<thead>
<tr>
<th>Protective shutter of type A1 – Operation by hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective shutter of type A2 – Operation by hand</td>
</tr>
<tr>
<td>Protective shutter of type A3 – Operation by means of an operating stick</td>
</tr>
<tr>
<td>Protective shutter of type A4 – Operation by hand</td>
</tr>
</tbody>
</table>

- a: Minimum distance of live parts from the edge of the insulating protective shutter
- b: Minimum distance of live parts from the insulating protective shutter
Insulating Protective Shutters

Type A1

5. Provide Protection against adjacent Live Parts – Insulating Protective Shutters

With finger holes, guide and limit mark for inserting and removing insulating protective shutters into / from guide rails by hand.

- The guide mark is a dotted line with a minimum distance of 525 mm from the rear shutter edge. The section beyond this mark must not be contacted when inserting the insulating protective shutter.
- The limit mark is a continuous line and separates the handle from the protective section. The section beyond this mark must not be contacted when inserting the insulating protective shutter and must be at least 525 mm away from live parts when the shutter has been inserted.

Type A2

With 90° angled handle and hand grips for inserting or removing insulating protective shutters into / from guide rails by hand. Other angled handles (70° to 270°) are available on request.

- The height of the handle has to be selected in such a way that live parts of the installation above the shutter are completely covered.

Guide rails and other accessories are listed in our template.
Work according to the 5 Safety Rules

5. Provide Protection against adjacent Live Parts – Insulating Protective Shutters

With retaining device with bayonet pin for inserting and removing insulating protective shutters into/from guide rails using an operating stick.

This shutter type is also available with a longitudinal slot and a retaining device (rotatable shutter). In this case, the shutter is operated using an operating stick with switching stick head.

Two persons are required to insert/remove shutter sizes exceeding 1 m². For this purpose, two retaining devices for attaching operating sticks are required.

Moreover, insulating protective shutters are also available with rolls.

<table>
<thead>
<tr>
<th>Type</th>
<th>ISP 36 PVC A3...</th>
<th>Part No.</th>
<th>763 231</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (U_r)</td>
<td>Up to 36 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Rigid PVC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

With finger holes (without additional marks) for use in factory assembled switchgear panels. Instead of finger holes, the shutters are also available with a grip (minimum height: 35 mm).

The shutter is inserted through a slot into the closed installation. The protective device of the installation must ensure full protection when inserting and removing the shutter. In type-tested switchgear installations in accordance with DIN VDE 0670-6 and 7 or EN/IEC 62271-200 (DIN VDE 0671-200), insulating protective shutters may only be used in consultation with the manufacturer of the switchgear installation.

<table>
<thead>
<tr>
<th>Type</th>
<th>ISP 36 PVC A4...</th>
<th>Part No.</th>
<th>763 241</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (U_r)</td>
<td>Up to 36 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Rigid PVC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inserting an insulating protective shutter of type A3 by means of an operating stick

Inserting an insulating protective shutter of type A4

Guide rails and other accessories are listed in our template.