Voltage Detecting Systems

The detection of presence or absence of operating voltage at enclosed switchgears and transformers with pluggable shockproof cable connectors requires tests with indicators and adapted capacitive voltage dividers.

IEC 61243-5 (E DIN VDE 0682 Part 415) defines the minimum requirements and test specifications for capacitive voltage detecting systems.

Our product range for Capacitive Voltage Detecting Systems (VDS) comprises

- coupling units (K): DEHNcap/M... (See pages 50 ... 51)
- voltage indicators (A): DEHNcap/... (See pages 55 ... 57)

Coupling Units, Fixed Components of the System

Coupling units are components of a separable voltage detecting system integrated into a switchgear. A coupling unit comprises the following components: coupling capacity (2), connecting lead (3), voltage limiting device (4), measuring circuit components (5) and test point (6). The coordinated components DEHNcap/TS Capacitive Divider Insulator and DEHNcap/M Interface Module form a complete coupling unit. The DEHNcap/TS Capacitive Divider Insulator provides the coupling capacity. All other components, i.e. voltage limiting device, measuring circuit components and test point are integrated into the DEHNcap/M Interface Module. The DEHNcap/M Interface Module is designed for three-phase a.c. systems with regard to its threshold voltages. If any equipment, e.g. lead-in insulator, transformer or other divider insulators provides the coupling capacity, the coupling unit can be designed with the DEHNcap/MDS Interface Module with an universal coupling electrode terminal. Both interface modules DEHNcap/M and DEHNcap/MDS are available as HR and LRM system.

Threshold Voltage, Clear Indication

In order to obtain a clear indication, the coupling units have to be designed to ensure an indication of “voltage present” at a line-to-earth voltage of max. 45% of the nominal voltage. At a line-to-earth voltage less than 10% of the rated voltage, no indication may appear. These limit values apply to any version of voltage detection system (HR, LRM system). This means that the threshold voltages of 90 V– for HR systems and 5 V– for LRM systems must be reached within the aforementioned limits.

Nominal Voltage and Rated Voltage

Coupling units in accordance with IEC 61243-5 (E DIN VDE 0682 Part 415) are preferably integrated into medium-voltage switchgears according to IEC 60298 (DIN VDE 0670 Part 6).

However, these two standards define the voltage differently. IEC 61243-5 (E DIN VDE 0682 Part 415) for capacitive voltage detecting systems defines the voltage as “nominal voltage” whereas IEC 60298 (DIN VDE 0670 Part 6) for medium-voltage switchgears describes the voltage as “rated voltage” (see Table below).

Table

<table>
<thead>
<tr>
<th>IEC/EN 61243-5 (DIN VDE 0682 Part 415)</th>
<th>Nominal Voltage in kV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td>IEC 60298 (DIN VDE 0670 Part 6)</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Capacitive Type Voltage Detecting System for high-voltage Installations, Basic Circuit Diagram

1 Live part of the high-voltage installation
2 Coupling capacity (coupling electrode with coupling dielectric)
3 Connecting lead
4 Voltage limiting device
5 Measuring circuit components
6 Test point
7 Terminal lead

K Coupling Unit DEHNcap/M...
A Voltage Detector DEHNcap/...
DEHNcap Coupling Units for Voltage Detecting Systems
in accordance with IEC 61243-5 (E DIN VDE 0682 Part 415)

for detecting the presence or absence of operating voltage, e.g.
– in enclosed switchgears
– at transformers with pluggable shockproof cable connectors

Interface Modules

– Type DEHNcap/MDS-HR connecting lead with universal connector for coupling electrodes, integrated voltage-limiting device and HR test points
– Type DEHNcap/MDS-LRM connecting lead with universal connector for coupling electrodes, integrated voltage-limiting device and LRM test points
– Type DEHNcap/M-HR connecting lead with special connector for coupling electrodes, integrated voltage-limiting device and HR test points suitable for divider insulator Type DEHNcap/TS
– Type DEHNcap/M-LRM connecting lead with special connector for coupling electrodes, integrated voltage-limiting device and LRM test points suitable for divider insulator Type DEHNcap/TS

Divider Insulator

– Type DEHNcap/TS 12 kV, 24 kV and 36 kV divider insulator with special connector for coupling electrodes suitable for interface modules Type DEHNcap/M

Application

Interface modules Type DEHNcap/M are especially designed for divider insulators Type DEHNcap/TS. They are available with the rated voltages 12 kV, 24 kV and 36 kV as HR or LRM test point.

Interface modules Type DEHNcap/MDS can be adapted to all available components with capacitive coupling electrodes, e.g. divider insulators, voltage converters as well as to external and internal cone cable connectors.

Please indicate some basic data when placing your order!
Coupling Unit of DEHNcap/MDS
1 Connecting lead for coupling electrode
2 Circuit with integrated voltage-limiting device and earthing terminal
3 Coaxial connector

Front Panel Components of DEHNcap/MDS
4 Test points (HR/LRM interface) with coaxial connecting lead
5 Fixing frame with socket cover

DEHNcap/TS Divider Insulator
1 Fixing points for current bar
2 Fixing point and earthing terminal
3 Terminal sockets of coupling electrodes

DEHNcap/M Interface Module
4 Terminal socket plug for coupling electrode with integrated voltage-limiting device
5 Connecting lead (coaxial)
6 Test point (HR/LRM interface)
7 Fixing frame with socket cover
DEHNcap/MDS Interface Module

For nominal voltages up to 45 kV / 50 Hz
In accordance with IEC 61243-5 (E DIN VDE 0682 Part 415)

- Three-pole cable set
- Tested on saline fog
- Application as a HR and LRM test point (test socket) incl. fixing frame and socket cover
- Separated coupling and front panel unit

For further information, please see also instructions for use No. 1352.

Front Panel Unit
Test point (test sockets), fixing frame with socket cover and coaxial connecting lead comprising 3 units each

<table>
<thead>
<tr>
<th>Test Point</th>
<th>Socket Spacing mm</th>
<th>Cable Length mm</th>
<th>Weight kg</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>19</td>
<td>4500</td>
<td>0.989</td>
<td>767 815</td>
</tr>
<tr>
<td>LR M</td>
<td>14</td>
<td>4500</td>
<td>0.989</td>
<td>767 825</td>
</tr>
</tbody>
</table>

Coupling Unit
Connecting lead for coupling electrodes, integrated voltage-limiting device, earthing terminal and terminal for connecting leads (coaxial coupling) to front panel unit comprising 3 units each

<table>
<thead>
<tr>
<th>System</th>
<th>Length of connecting lead for coupling electrode mm</th>
<th>Weight kg</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>200</td>
<td>0.140</td>
<td>767 816</td>
</tr>
<tr>
<td>LRM</td>
<td>200</td>
<td>0.144</td>
<td>767 826</td>
</tr>
</tbody>
</table>

Please indicate the following when placing your order:
- type of test point (test socket): HR or LRM system
- length of connecting/coaxial lead to front panel unit (if not 4500 mm): ........................................ mm
- value of existing coupling capacity: ........................................ pF
- nominal voltage of the installation: ........................................ kV

Spare Part
Fixing Frame with Socket Cover
for Front Panel Unit of DEHNcap/MDS and DEHNcap/M Interface Module
comprising 3 units each

<table>
<thead>
<tr>
<th>Type</th>
<th>Weight kg</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR test point</td>
<td>0.035</td>
<td>767 801</td>
</tr>
<tr>
<td>LRM test point</td>
<td>0.035</td>
<td>767 802</td>
</tr>
</tbody>
</table>

Special version: Single-pole version with appropriate connector for coupling electrode (e.g. ring cable lug, receptacle) available on request.