INSTRUCTIONS FOR USE

1. General instructions for use

1.1 The high-voltage detector may only be used for electrical installations with nominal voltages and nominal frequencies it is designed for! Otherwise, the user puts himself into serious danger! The above mentioned high-voltage detector is designed for nominal voltages between 1 and 420 kV.

1.2 The safe isolation test must always be carried out on site for all poles (see EN 50110-1, Subclause 6.2.3).

1.3 The high-voltage detector has to be checked for faultless operation before and after use.

1.4 For use, the high-voltage detector may be taken by the handle only and must be used from a safe position to ensure that the operator keeps the required safety distance from all live parts of the system (see Fig. 6).

1.5 For voltages ranging between 1 and 36 kV, the high-voltage detector may be used with an attached protective cap only.

2. Design

2.1 Fig. 1 shows the design of HSA 205 high-voltage detector.

2.2 The detector consists of a robust tube where the operating head including control unit (switching ring) and the indicator (visual and acoustic) are attached to. The red ring (6) marks the end of the insulating part in the direction of the operating head. It shows the operator how close he can move towards the live parts while still keeping the minimum safety distances A. The insulating part (4) is the section of the operating rod between the hand guard and red ring. It provides a safety distance for the operator and sufficient insulation for safe handling (see section 5.6). A hand guard (3) separates clearly the handle (2) from the insulating part. A supporting loop (1), if properly used, prevents the operator from dropping the high-voltage detector accidentally or allows him to fasten the detector to his supporting belt.

2.3 Visual and acoustic indication is performed with very bright LEDs and Piezo sound sources.

3. Principle of operation and special features

The non-contact high-voltage detector measures the flux lines of the electrical field formed between a live part of the system and the earth potential (see Fig. 2).

3.1 When the operating head of the high-voltage detector is inserted into such an alternating electrical field, a displacement current flows via the test electrodes E1 and E2 (capacitor principle). This current is evaluated and indicated by the downstream electronic circuit (visually and acoustically) (see Fig. 3). If the displacement current exceeds the threshold value (\(<20\%\) of the nominal voltage), the high-voltage detector generates an intermittent visual and acoustic signal - voltage present at a frequency increased by a factor of 10. Moving the detector closer to the live part of the system, the frequency of the signal rises accordingly.

3.2 The high-voltage detector is equipped with an internal test generator for function tests. The charge state of the battery is indicated by the green LEDs which are illuminated intermittently at intervals of approximately 2 s. The test signals are indicated visually (green LEDs) and acoustically.

4. Special instructions for use

4.1 The operating head to the conductor. The high-voltage detector is designed for use at overhead lines as well as outdoor and indoor switchgear.

4.2 Any bridging between live parts or between live and earthed parts has to be excluded for using the high voltage detector HSA 205 in nominal voltage ranges up to 36 kV. For safety reasons (risk of bridging) the operating head has to be attached a transparent protective cap for approaching it to the energised installation at 1 ... 36 kV.

4.3 The high-voltage detector can be used only conditionally for prefabricated switchgears according to DIN VDE 0670 Parts 6 and 7 and installations according to DIN VDE 0101. Before using the detector in prefabricated switchgears, it should be enquired from the manufacturer whether and where the high-voltage detector can be used.

4.4 Visual and acoustic indication (see Table 1).

4.5 The detector can be used at temperatures from – 25°C to + 55°C. The temperature for storing the detector including the power supply, the high-voltage detector must touch the nut at the end of the cable connector as shown in Fig. 5.

4.6 The high-voltage detector is a multi-range voltage detector. The voltage ranges can be changed with the yellow switching ring at the operating head (see Fig. 4).

4.7 The detector can be used from any position (see Fig. 5).

5. Operation

5.1 The high-voltage detector has a yellow knurled switching ring attached to the operating head. Turning this ring, the detector is turned on and the required nominal voltage range can be set at the same time (see Fig. 4).

5.2 The high-voltage detector is ready for operation after being activated and after the battery test (see Table 1).
6. Battery exchange
6.1 Remove the attached transparent protective cap.
6.2 Release the axial flat headed screw in the cap (see Fig. 4) and remove the cap.
6.3 Loosen the now visible cylindrical screws on the display.
6.4 Pull the indicator out of the tube until the battery compartment is accessible.
6.5 Set in a 9 V block battery (ensure correct polarity).
6.6 Insert the indicator into the insulating tube.
6.7 Tighten the cylinder screws.
6.8 Attach the cap.
6.9 Tighten the axial flat headed screw.
6.10 If the batteries of several voltage detectors have to be exchanged at the same time, ensure that the single parts of the equipment are not mixed up!
6.11 Carry out a function test (see section 3.2 and Table 1).
6.12 Attach the transparent protective cap.

Batteries to be used:
9 V E block battery (IEC 6LR61), leak-proof, e.g. Panasonic Power Max 3 6LR61/1P Duracell Alkaline Manganese MN 1604 Kodak XTRALIFE Alkaline Manganese K9V Kodak Ultralife Lithium Cell U9VL.

7. Maintenance and care
Care and maintenance of the high-voltage detector are limited to
– storing and transporting the high-voltage detector in the corresponding storage bag (Part. No. 767 531),
– keeping the insulating tube clean.
The detector may be repaired and adjusted by the manufacturer only.

8. Maintenance tests
The test intervals for the high-voltage detector depend on its conditions of use, e.g. frequency of use, stress due to environmental conditions and transport.
According to the owner's quality management system, the device should be checked at least every 6 years.

9. Tampering with the equipment, changes or modifications are not permissible
Any modification of the equipment invalidates the warranty!

10. Keep these instructions for use!

11. Instructions in brief
11.1 Take the high-voltage detector out of the storage bag.
11.2 Switch on the high-voltage detector and set the nominal voltage range required for the nominal system voltage.
11.3 Attach the transparent protective cap.
11.4 Take the high-voltage detector by the handle only when checking safe isolation, i.e. below the handguard.
11.5 Aim the operating head to the part of the system to be checked (see Fig. 6).
11.6 Voltage present is indicated by an intermittent acoustic and visual (red) warning signal at a frequency increased by a factor of 10. The frequency of the warning signal rises if the detector is moved closer.

Table 1

<table>
<thead>
<tr>
<th>Switching on</th>
<th>Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery test</td>
<td>Function test</td>
</tr>
<tr>
<td>OK</td>
<td>Low</td>
</tr>
<tr>
<td>Short green signal</td>
<td>Permanent red and acoustic signal</td>
</tr>
</tbody>
</table>

5 Outlet for acoustic signal 10 Indicator of nominal voltage range
6 Red ring 11 Protective cap
8 Visual indicator (blinking ring) 12 Measuring and evaluation system
9 Switching ring 13 Cap

Fig. 4: Operating head with indicator

Fig. 5

Fig. 6: Application example