MEDIUM VOLTAGE PRODUCT

KECA 80 D85 Current Sensor
Instructions for installation, use and maintenance
Scope of Contents

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Instructions for installation, use and maintenance for the KECA 80 D85 current sensor

These instructions for installation, use and maintenance are valid for KECA 80 D85 current electronic transformers (sensors) operating in indoor conditions. The current sensor type KECA 80 D85 is intended for use in current measurement in medium voltage switchgear. The current sensor shall be installed over a screened bushing insulator, screened insulated cable or any other type of screened insulated conductor. The case of sensor is made from plastic, the internal parts are shielded and this shielding is earthed. The primary conductor must be insulated and screened from the application voltage – conductive screening must be at ground potential. The insulation of primary conductor determines the highest permissible system voltage.

1. Operating conditions

The sensor should be mounted in dry, indoor conditions without excess ingress of dust and corrosive gases. The sensor must be protected against unusually heavy deposits of dust or similar pollution, as well as against direct sunshine. The sensor is designed for standard ambient temperature between -25°C and +80°C (storage and transportation temperature between -40°C and +80°C). The altitude for mounting should be lower than 1000 m above sea level.

The sensor may also be used at higher altitudes when agreed upon with the manufacturer.

2. Technical details

For sensor dimensions see dimension drawings at the end of these instructions. Rated values for each individual sensor are mentioned on the rating plate glued to the sensor. Values mentioned on the rating plate must not be exceeded.

<table>
<thead>
<tr>
<th>KECA 80 D85</th>
<th>Type code</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/N</td>
<td>Serial number</td>
</tr>
<tr>
<td>Ipr</td>
<td>Rated primary current</td>
</tr>
<tr>
<td>Usr</td>
<td>Rated secondary voltage in V corresponding to a given rated frequency</td>
</tr>
<tr>
<td>cl.</td>
<td>Accuracy class</td>
</tr>
<tr>
<td>Kpcr</td>
<td>Rated extended primary current factor</td>
</tr>
<tr>
<td>Cfs.</td>
<td>Correction factors used for current sensor. Amplitude correction factor is a number by which the output of sensor must be multiplied in order to have minimum amplitude error. Phase error correction factor is a number by which the output of the sensor must be increased or decreased (depending on the sign) in order to have minimum phase error.</td>
</tr>
<tr>
<td>ai</td>
<td>Amplitude correction factor of a current sensor</td>
</tr>
<tr>
<td>pl</td>
<td>Phase error correction factor of a current sensor in degrees</td>
</tr>
<tr>
<td>fr</td>
<td>Rated frequency in Hz</td>
</tr>
<tr>
<td>Ith/idyn</td>
<td>Rated short-time thermal current in kA / Rated dynamic current in kA</td>
</tr>
<tr>
<td>0.25 kg</td>
<td>Weight</td>
</tr>
<tr>
<td>E</td>
<td>Insulation class</td>
</tr>
<tr>
<td>IEC 60044-8</td>
<td>IEC – standard referred to</td>
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<tr>
<td>16 Feb 2015</td>
<td>Date of production</td>
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Tab. 1. Labels abbreviation definitions
02 Example of data stored in 2D Bar Code

03 Example of Amplitude Correction factor (aI) setting for current sensor into REF601

04 Example of Amplitude (aI) and Phase error (pI) correction factors setting for current sensor into REF615
3. Instruction for installation

**Safety instruction**
Always ground the sensor grounding terminal.

**Installation conditions**
The sensor should be installed in dry, indoor conditions. The temperature during the assembly must be between 0°C and +40°C. The sensor cable should not be moved or bent if the temperature is below 0°C.

**Installation on MV cable or insulated conductor**
The sensor is used for installation on insulated & shielded MV cable or conductor. Before sensor installation it is necessary to adjust clamping system according to MV cable/conductor diameter. It is possible to set several sizes of diameters according to the marks marked on the clamping system. After appropriate setting of clamping system, install the sensor on the MV cable/conductor using a snap-lock system. Cable sensor output must be at the top. After the fixation the sensor is automatically centered to achieve an optimal function and measurement accuracy, see Figure 5. Finally, it is necessary to install tightening strips to ensure the sensor position, see Fig. 6. The end of the shield near the sensor is grounded by a wire that passes through the sensor window, as shown also in Figure 5. The current flowing in the shield flows through the grounding lead, which is also in the sensor window. The fluxes produced by the current flow in the shield and in the grounding lead are equal but opposite in direction and, therefore, the output of the current sensor is not affected by the flow of current in the shield. The sensor can be also used without holders; in this case the maximum usable cable diameter is 85 mm.
**Clamping system**

It is necessary to adjust sensor diameter according to the MV cable diameter. The diameter can be adjusted using adjustable holders, see attachment drawings. For the required diameter use the marked values on the holder. The arrow on holder shows in the right direction the diameter adjustment. Both sides of the holders can be used to adjust the diameter.

Thus, the diameter range can be set in two configurations. First mode allow to set diameter in the range from 20 mm to 42.5 mm. The second mode allows setting of diameter in the range from 50 mm to 80 mm, see Fig. 6 and attachment drawing. **During the clamping / opening the sensor on the cable, please use both hands according to Fig. 6.**
Maximum allowed angle and distance from the center of the MV cable/straight insulated conductor and the center of the sensor is shown on Figure 8 and Figure 9.

Secondary connections
The secondary cable is a single shielded cable designed to give maximum EMI shielding. The secondary cable is separable part of sensor and cannot be additionally extended, shortened, branched, modified, withdrawn or changed due to the guarantee of accuracy and performance of the sensor.

The cable must be connected directly (or via a connector adapter if needed - for more information about connector adapters and coupling adapter refer to Doc. No. 1VLC000710 - Sensor Accessories) to electronic measurement equipment (e.g. IED). The electrical shielding of cable is connected to connector shielding and must be earthed on “electronic measurement equipment” side. The cable must be fixed close to metal wall or inserted inside of metal cable tray far from power cables! The minimal bending radius for the cable is 35 mm. The cable is not to be moved if the temperature is below 0 °C. If cable, connector or connector grommet is damaged please contact the manufacturer for instructions.

The used RJ-45-type connectors are screened and designed to guarantee low resistance shielding; they are particularly adapted to applications where electromagnetic compatibility (EMC) is important. The connectors are robust but it is necessary to be careful during their assembly – do not use force!

Note: It is recommended to use a cable tie to fasten long sensor cables approximately 10 cm from the RJ-45 socket.

The sensor plug connector pin’s assignment is shown on Figure 11. (Front view).

A cable not connected to the relay can be left open or short-circuited without any harm for the sensor. Even during a primary short-circuit the voltage in the secondary circuit of the current sensor will be below 100 V. Nevertheless it is a good safety practice to earth cables not connected to the relay.

RJ45 plug connector has 8 contacts and locking latch coupling. The sensor connector plug must
be inserted properly with the relay matting receptacle before completing the coupling with the bayonet lock. Take care and do not use excessive force to plug-in and plug-out these connectors.

**Connection to the sensor**
The connection between cable and sensor is provided by LEMO/ODU push-pull type connector, see Fig. 12.

**Grounding terminal**
The sensor’s grounding terminal is located on the sensor’s terminal part and shall be connected to the ground using the grounding wire (part of sensor delivery) during the sensor operation, see Fig. 13.

**Routine test report**
The routine test report includes following tests:
- a) Verification of terminal marking
- b) Power-frequency withstand test on secondary circuits (see Note 1)
- c) Test for accuracy

Correction factors are measured separately for each sensor during routine testing and are marked on the rating plate. The use of correction factors is required condition in order to achieve the declared accuracy class.

**Note 1:**
The maximum power-frequency test voltage for current sensor secondary terminals (connector) is 0.5 kV. Test voltage can be connected between short-circuits signal wires and the earth.

**5. Instructions for maintenance**
Excessive dust or other kinds of pollution must be brushed off the sensor. Polluted sensors can be cleaned with spirit or petrol.
Otherwise, during normal use the sensors do not need any additional maintenance.

**6. Transport and storage**
The permissible transport and storage temperature for sensors is -40...+80°C. During transport and storage the sensors must be protected against direct sunshine. The sensors are delivered packed into wooden boxes or transport pallets.

**7. Recommended procedure for disposal of the sensor**
The sensor does not contain environmentally hazardous materials. For disposal of the product after it has been taken out of use, local regulations, if there are any, should be followed.
KECA 80 D85

RATING PLATE

CABLE LENGTH 5 m
CONNECTOR RJ45 CAT6

CONNECTOR RJ45 CAT6

PIN 1
PIN 8

PIN 4 - COIL START (S1)
PIN 5 - COIL END (S2)
Configurations of clamping system

<table>
<thead>
<tr>
<th>POSITION NUMBER</th>
<th>MAX. CABLE OUTER DIAMETER D [mm]</th>
<th>POSITION NUMBER</th>
<th>MAX. CABLE OUTER DIAMETER D [mm]</th>
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<tbody>
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<td>20</td>
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<tr>
<td>80</td>
<td>80</td>
<td>/</td>
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