MEDIUM VOLTAGE PRODUCT

KEVCD B combined current and voltage sensor

Instructions for installation, use and maintenance

Scope of Contents

2	**1. Operating conditions**
2	**2. Technical details**
4	**3. Instructions for installation**
4	Safety instructions
4	Mounting
4	Primary connections
4	Secondary connections
5	**4. Capacitive voltage indicator**
5	Connection interface
5	Voltage indicator
5	**5. Instructions for use**
5	Routine test report
6	**6. Instructions for maintenance**
6	**7. Transport and storage**
6	**8. Recommended procedure for disposal of the sensor**

Instructions for installation, use and maintenance for the KEVCD B combined current and voltage sensor

This installation, use and maintenance guide is valid for KEVCD B combined current and voltage electronic transformers (sensors) operating in indoor conditions in the following variants:

Type designation	Functions included		
	Voltage sensor	Current sensor	Voltage indication
KEVCD 12 BE2	■	■	■
KEVCD 12 BG2		■	■
KEVCD 17.5 BE2	■	■	■
KEVCD 17.5 BG2		■	■
KEVCD 24 BE2	■	■	■
KEVCD 24 BG2		■	■

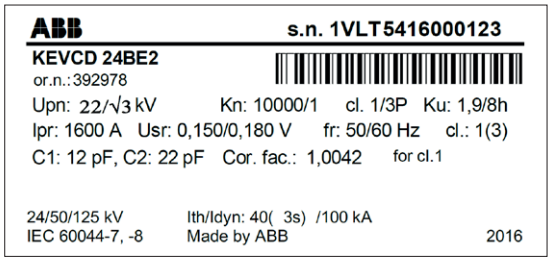
Tab. 1. Sensor variants

1. Operating conditions

The combined 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 -5°C and +40°C (storage and transportation temperature between -40°C and +70°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 separate dimension drawings. 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.



01 Example of rating plate (label)

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02 Example of Correction factors (aI, pI) setting for current sensor into REF542plus
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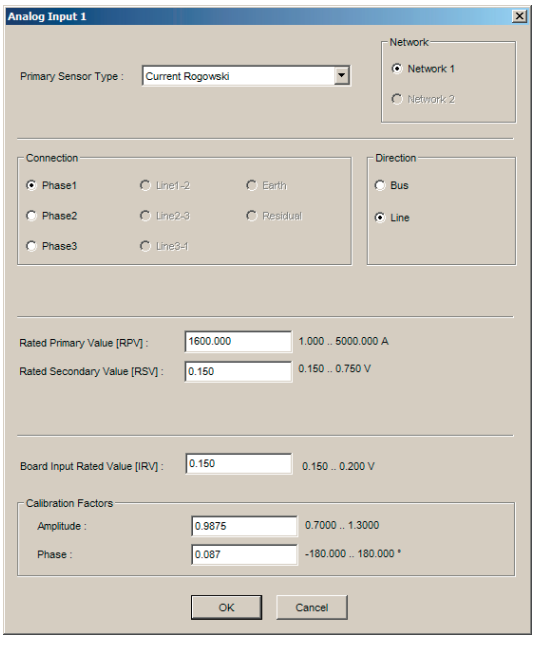
03 Example of Correction factors (aU, pU) setting for voltage sensor into REF542plus

s.n :	Serial number
KEVCD 24BE2	Sensor type code
or.n.	Order number
Upn	Rated primary voltage in kV
Kn	Rated transformation ratio for voltage measurement
cl.	Accuracy class
Ku	Voltage factor
Ipr	Rated primary current
Usr	Rated secondary voltage in V corresponding to a given rated frequency
fr	Rated frequency in Hz
C1	Capacitance between primary conductor and Ck-electrode
C2	Capacitance between Ck-electrode and earthed part of the sensor
Cfs:	Correction factors used for voltage and current sensors. 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.
24/50/125 kV	Rated insulation levels in kV; 24 highest voltage for equipment / 50 rated power frequency withstand voltage 1 min / 125 rated lightning impulse withstand voltage (peak)
Ith/Idyn	Rated short-time thermal current in kA / Rated dynamic current in kA
IEC 60044-7, -8	IEC --- standards referred to
2016	Production year

Tab. 2. Labels abbreviation definitions



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03

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04
Busbar fixing
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05
Connection between the sensor and IED

3. Instructions for installation

Safety instructions

a) Always consider the sensor as a part of the circuit to which it is connected, and do not touch the leads or other parts of the sensor unless they are known to be grounded.
b) Always ground the metallic base plate of the sensor.
c) Voltage indication must be earthed with a separate wire whenever it is not used.

Mounting

The mounting position for the sensor can be freely chosen. The sensor is fixed using the base plate with four screws and washers. For KEVCD 12_ and 17.5_ types the screw and washer size is M10 and for KEVCD 24_ types it is M12. Fastening must be done on a smooth surface. One of the M10/M12 screws must be earthed. It must be ensured that the ground screw has an electrical connection with the metallic base plate of the sensor.

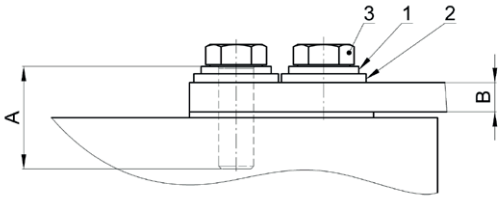
Use a torque spanner, if necessary. Strength class for the screws is 8.8. The length of the screw within the nut part is at least 1.4x the screw diameter.

Screw	Max. torque [Nm]	Min. torque [Nm]
M6	3.5	2.8
M10	35	20
M12	50	45

Tab. 3. Maximum allowed torques for screw connections

Primary connections

M12 size screws are used in the primary terminals. For primary connection allowed torques, screw lengths, washers and terminal markings see Tab. 3 and Fig. 4.



1 Washer (SFS 3738)
2 Spring washer (DIN 6796)
3 Screw M12

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A (mm)	B (mm)
30	2...10
35...40	10...15
40...45	15...20
45...50	20...25
50...55	25...30

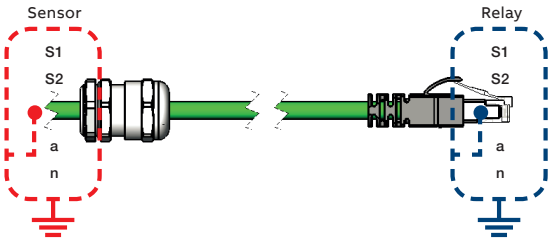
Tab. 4. Primary connection parameters

Note: For proper connection, washers for separate terminal screws used in the primary connections must not touch each other.

Secondary connections

The secondary cable is a single shielded cable designed to give maximum EMI shielding. The sensor is always designed and tested with certain cable length. Sensors cables cannot be additionally extended, shortened, branched or modified due to the guarantee of accuracy and performance of the sensor.

Cable shielding is grounded on both sides, see Fig. 5. If a cable is damaged please contact the manufacturer for instructions.



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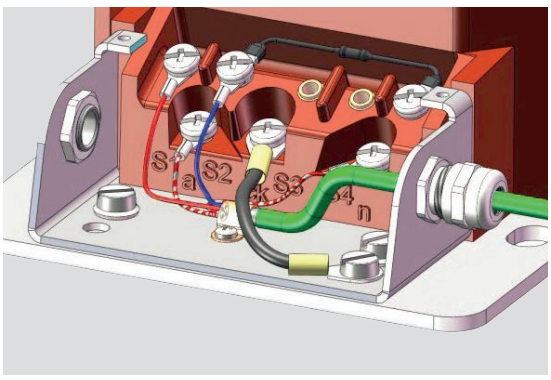
The cable is equipped with a cable eyes on the sensor side, see Fig. 6., and with a RJ-45 connector on the relay side.
RJ-45 connector is keyed to prevent all errors in alignment.



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06
Cable with a cable eyes
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07
Connector RJ-45
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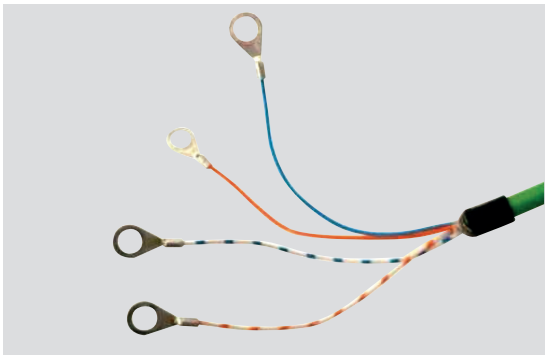
08
Coupling system interface



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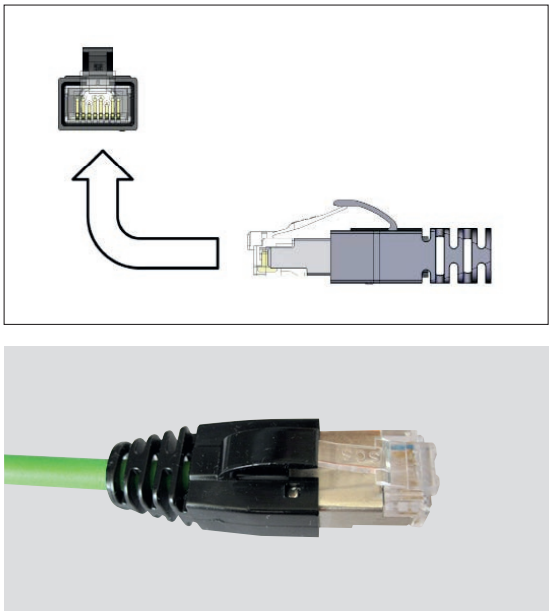
The used RJ-45-type connectors are screened and designed to guarantee low resistance shielding; they are particularly adapted to applications where electromagnetic compatibility (EMC) is important. The connectors are robust but it is necessary to be careful during their assembly --- do not use force!



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

4. Capacitive voltage indicator

A separable voltage detecting system is used in the sensors technology. The sensors are commonly equipped with a coupling system (an indicator and indicator connection are not part of the delivery).

The coupling system is tested according to the GCE A106001 instruction, based on IEC 61243-5 and VDE 0682 Part 415 standards.

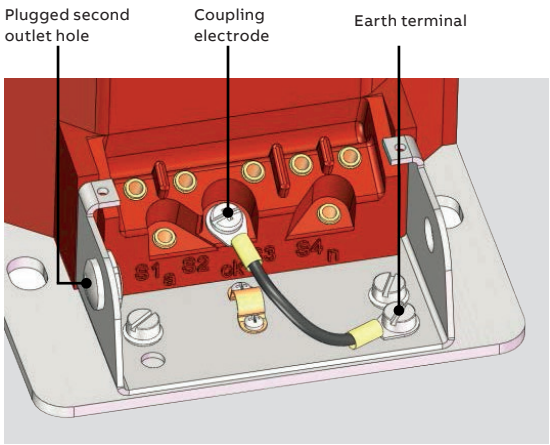
Electrode	Sensor Highest voltage of equipment	
	12 and 17.5 kV	24 kV
C1	(23 – 40) pF	(10 – 48) pF
C2	≤25 pF	≤25 pF

Tab. 5. Capacitance values

C1 capacitance between primary conductor and coupling electrode

C2 capacitance between coupling electrode and earthed parts

Connection interface
The connection interface is realized by M6 terminals, see Fig. 8. Use a torque spanner, if necessary. Maximum allowed torques are mentioned in Tab. 3. The screen of screened connecting leads should be earthed. The second (left side) outlet hole is intended for connecton of capacitive voltage indicator cable. The hole has a diametter for M12 bushing and is plugged from production.



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The coupling electrode terminal must be earthed with a separate wire whenever it is not used (see Fig. 8.)!

Voltage indicator
A voltage indicator is not part of the delivery.

5. Instructions for use

The combined voltage and current sensors are used:

- To convert large voltages and currents in the primary circuit of the network to the appropriate signal for the secondary equipment (e.g. IEDs)
- To insulate primary and secondary circuits from each other
- To protect secondary equipments from harmful effects or large voltages and currents during abnormal situations in the network

The use of a sensor for other purposes than those described above is forbidden.

Routine test report

a) Verification of terminal marking
b) Power-frequency withstand test on the primary circuit
c) Partial discharge measurement
d) Power-frequency withstand test on secondary circuits (see Note 1)
e) Test for accuracy
f) Measurement of a capacitive voltage indicator

Note 1:

a) No power-frequency withstand test on secondary terminals (connector) of the voltage sensor is allowed.
b) 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.

6. Instructions for maintenance

Excessive dust or other kinds of pollution must be brushed off the sensor. Polluted sensors can be cleaned with spirit, petrol or toluene. Traces of arcs and minor surface damages can be easily removed with sandpaper after which the surface is to be treated by applying a thin layer of silicone paste on it. Instructions for repairing bigger surface damage must be requested from the manufacturer.

Otherwise, during normal use the sensors do not need any additional maintenance.

7. Transport and storage

The permissible transport and storage temperature for sensors is from -40 to +70°C. During transport and storage the sensors must be protected against direct sunshine. The sensors are delivered packed into wooden boxes or fastened to transport pallets.

8. 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.

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