

<b>Examination Procedure</b>  Rubrik / Title <b>Insulation resistance measurement</b>	Beteckning / Document <b>KBE EP-114</b>
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## 1 Scope

This Examination Procedure is applicable as routine inspection to all electrical equipment.

## 2 Objective

To verify the insulation resistance of the product.

## 3 Method

The insulation resistance measurement is to be performed on completed items. Interference suppression capacitors fitted between live and exposed electrically conducting parts must not be disconnected.

The insulation resistance meter is to be connected in turn to each external connections. E.g. terminal blocks, connectors or leads which always or in certain operational states shall be galvanically isolated from each other.

The insulation resistance is to be measured between:

- Individual conductors and protective earth;
- Conductors and associated screens;
- Cable screens and protective earth.

Measurements are to be made in indoor atmospheric conditions and with measurement voltage as specified below. The insulation meter must be able to detect insulation resistances 100 times higher than the acceptance criteria.

If the item or equipment contains relays or switches, these are to be operated if necessary, so that the measured insulation resistance relates to the entire circuit. Alternatively, measurements may be performed as partial, and the total resistance of the circuit may be calculated.

### Electronic equipment

Inputs and outputs of galvanically separated circuits must be checked, i.e. inputs and outputs connected via transformers, relays, optoisolators and isolating amplifiers. Other inputs and outputs may not be tested.

The following conditions apply:

- Circuit boards may be removed during the test, provided they do not include circuits to be tested.
- Circuits to be tested must be complete. When circuit boards include circuits which constitute internal parts of voltage-insulating devices, the circuit boards must be included in the test or be short-circuited.
- Signal grounds shall be connected to the protective earth conductor.

### Measurement voltage

Rated voltage	Measurement voltage
$\leq 60$ V	100 V DC
60 - 440 V	500 V DC
440 - 1 000 V	1 000 V DC

## 4 Acceptance Criteria

In all individual circuits, insulation resistance must not be less than 100 Mohm unless otherwise specified in the Technical Specification.

## 5 Documentation

Inspection performed is to be documented in a inspection certificate, record or technical report as required in the Inspection Plan. Several examinations within one and the same Inspection Plan may be reported in the same document.

Examinations carried out as routine (100%) inspection are to be reported to the Purchaser as original documents.

The document must as a minimum include the following:

- Items examined

Product, designation, quantity, serial numbers and reference to the Purchasers order.

- Identity / Traceability

The identity of the objects under examination in comparison with type tested items and in comparison with relevant specifications must be specified, unless the identity is certified in a separate document (as per KBE EP-180).

- Examination procedure

It must be clearly stated if the inspection has been performed according to this Examination Procedure or to any other procedure agreed upon.

- Measurement equipment

Type of equipment, accuracy, identification, etc, and current calibration data for the equipment used where performance is significant to the results.

- Results

It must be evident that the items have fulfilled stated requirements and acceptance criteria. Measured and recorded values that are to be documented as per the procedure as well as any deviations from requirements in applicable specifications or test procedures must be reported.

- Approval

Date of inspection and name of responsible inspector are to be included. The document must be reviewed and approved in accordance with the Manufacturers or the laboratory's internal QA/QC routines.