



Inspections

RTL-Palvelut Oy can provide You authorized inspections with good practice and wide experience of different kind of installations.

National Safety Technology Authority Turvatekniikan keskus, TUKES has given authorization to Reijo Lintula (B.sc, Electrical Engineering, EUR ing.) perform variety of inspections. His authorization authentication number is VTS 001.

The Finnish electrical safety regulations lay down three kinds of inspections: the commissioning inspection, the certification inspection and the periodical inspection.

Installation work has to be inspected thoroughly by the installer. This commissioning inspection has to be done for all kinds of installation work. For larger installations and for certain special installations, a certification inspection has to be performed by an authorized inspector or an authorized inspection body. The entrepreneur must order the certification inspection, and the results must be given to the owner of the installation.

This is when you can make a phone call to Reijo and ask for details.

Initial or periodical inspection of fixed installation

SCOPE OF WORK

The scope of the work is to give a professional opinion of the installations condition by carrying out visual inspections and instrument test of those parts of the fixed wiring installation which are accessible or measurable.

The test and inspections shall contain (separately from each distribution box or supply area):

- Inspection of final or available documentation
- Characteristics of supply at the origin of the installation
- Visual inspection
- Insulation resistance test (usually applicable only in initial testing and/or TN-systems)
- EB- wires and PE -wires continuity test
- Earth fault loop impedance test
- Prospective short circuit currents
- Operation of residual current devices
- Polarity check (mainly visual)
- Phase rotation

DOCUMENTATION

Presence of diagrams, instructions and similar information will be checked and verified to fixed installation.

Particulars of installation including supply characteristics and main earthing and bonding details should be final and final during inspection.

CHARACTERISTICS OF SUPPLY

The characteristics of supply at the origin of the installation would be determined and would include the following:

- Nominal voltage.
- Nature of current and frequency.
- Prospective short circuit current.
- External earth fault loop (L-PE) and internal fault loop impedances (L-N, L-L)
- Maximum existing current each phase, neutral and PE in amps.
- Type of rating of supplier's overcurrent protective device.

VISUAL INSPECTION

Inspection comprising careful scrutiny of every installation, where required, shall be carried out in accordance with the requirements of this chapter.

- The safety of the persons and livestock against the effects of electric shock and burns
- Protection against damage to property by fire and heat arising from an installation defect, and
- The identification that the installation is not damaged or deteriorated so as to impair safety, and
- On a sampling basis, check that conductors are readily identified
- No signs of overloading of conductors and accessories.
- On a sampling basis, check correct connection of socket outlets

- Presence of appropriate devices for isolation and switching

- Choice and setting of protective devices to include:

(a) Fuses/MCB's/Circuit breakers are of correct type and rating for intended use.

(b) Tabulated current rating of cables is equal to or greater than Setting of protection device.

- Labelling of circuits, fuses, switches, distribution boards, terminals etc. to indicate and its purpose.

- Presence of danger notices and other warning labels when needed

- Identifying dangers, which might arrive during instrument testing or in maintenance.

- Enclosures and Mechanical Protection. The enclosure and mechanical protection of all electrical apparatus and equipment should be inspected to ensure that their condition remains adequate for type of protection needed.

- External influences. Note should be made of any known changes in external influences, building structure, and alterations or additions which may have affected the suitability of the wiring for its present load and method of installation.

Note should be made of any alterations for additions of an irregular nature to the installation. If unsuitable material has been used the Report should indicate this together with reference to any evident faulty workmanship or design.

The installation would not be dismantled in any other way other than opening equipment covers and the building structure would not be disturbed.

INSULATION RESISTANCE

Insulation resistance tests between phase conductors, neutral and earth, and excepting any electronic equipment which may be damaged by the test, would be carried out to verify that the insulation of conductors, electrical accessories and equipment is satisfactory and that electrical conduc-

tors or protective conductors are not short circuited, or show a too low resistance which would indicate deterioration in the insulation.

The test would be carried out in TN-S systems with all fuses in place, switches and circuit breakers closed, and other equipment disconnected as appropriate.

Where the removal of lamps and/or the disconnection of current using equipment is impracticable, the local switches controlling such lamps and/or equipment would be open (e.g. TN-C systems).

Insulation resistance tests would be carried out from all main switchboards with supply cables and sub-main cables.

At distribution boards, insulation resistance tests would be carried out at the bus-bars and would include all final circuits connected to the distribution board, tested collectively. All relays etc. circuits (circuit open when not energized) will be tested separately.

CONTINUITY

Protective conductors would be tested to verify that the conductors are Electrically sound and correctly connected.

This test should include:

- (a) All bonding conductors.
- (b) All earth visible clamps.
- (c) All metal accessories and equipment within a height of 3.5m above floor level.
- (d) Each lighting point on all lighting circuits and each socket outlet.

The results of continuity tests shall not be recorded when results are reasonable. When necessary, conductors will be rechecked by loop impedance test to verify automatic disconnection.

EARTH FAULT LOOP IMPEDANCE

Measurements would be made of the earth fault loop impedance at the main intake, all switchboards, distribution boards on random basis.

On lighting circuits and socket outlets (on a random basis), with a minimum of one luminaire and socket outlet, preferably the furthest and thinnest ones from the distribution board, will be tested.

PROSPECTIVE SHORT CIRCUIT CURRENT

The prospective fault current, under both short-circuits and earth fault conditions, at every relevant point of the complete installation shall be determined. This shall be done by calculation, ascertained by enquiry or by measurement.

OPERATION OF RESIDUAL CURRENT DEVICES

Where protection against indirect contact is provided by a residual current device, its effectiveness shall be verified by a test simulating an appropriate fault condition and independent of any test facility incorporated in the device.

The test would be made on the load side of the device, between the phase conductor of the circuit protected and the associated PE, so that a suitable residual current flows. All loads normally supplied through the device would be disconnected during the test.

General purpose rcdds to SFS-EN 61008 or rcbo's to SFS-EN 61009

- (a) with a fault current flowing equivalent to 50% of the rated tripping current of the rcd for a period of 2 s, the device should not open
- (b) with a fault current flowing equivalent to 100% of the rated tripping current of the rcd, the device should open in less than 300 ms unless it is of "Type S" (or selective) which incorporates an intentional time delay. In this case it should trip within the time range of 130 ms and 500 ms.

Additional requirements for supplementary protection. Where the 30 mA rcd is used to provide supplementary protection against direct contact, with a test current of 150 mA the device should open in less than 40 ms.

Since some residual current devices are either partially desensitized or totally disabled by waveforms containing a pulsating D.C. component, the instrument used would have a D.C. test facility which should cause the device to trip within 300 ms.

All the above tests would be carried out at phase angles of 0° or 180°. Test current should comply with RCD-type (AC, A or B) and differences in between limit values should be considered.

The effectiveness of the test button or other test facility integral with the device would be tested after application of the externally applied tests described above.

POLARITY

A test of polarity would be carried out to verify that fuses and single pole control devices are connected in the phase conductor only. Test does not contain testing in light switches etc. which are not easily accessible.

PHASE ROTATION

Each distribution board must be checked to determine right phase direction.

TEST REPORT

All test reports will be delivered to customer in Adobe *.pdf and MS Excel *.xls files. On completion, documentation would be provided including all instrument test results.

The report shall be set out as follows:

All items individually numbered.

The location of the remedial item stated.

All items of remedial works shall include the local regulation or standard reference number of which they are in breach.

Each item of remedial works would be classified with a reference number as follows:

1 - REQUIRES IMMEDIATE ATTENTION

2 - REQUIRES ATTENTION AS SOON AS PRACTICABLE - COULD DETERIORATE AND BECOME A DANGER

3 - REQUIRED TO BRING INSTALLATION INTO LINE WITH CURRENT STANDARDS OF GOOD WORKMANSHIP AND PRACTICES AND OTHER SIGNIFICANT FINDINGS

LABELS

Main distribution board tested would be provided with an adhesive label, fixed to the front cover indicating the date inspection took place.