

High Integrity Earthing

Technology Installation Services

Providing a fully integrated installation service for the
Computer/Telecommunications Industry

Large enough to cope
Small enough to care!

WHAT IS HIGH INTEGRITY EARTHING?

High integrity earthing covers earthing requirements for the installation of equipment having high earth leakage currents.

A computer is an item of equipment with high earth leakage currents.

Section 607 of the (IEE Regulations) BS 7671 describes the requirements for this regulation and the precautions that should be taken.

The requirements apply to every installation where equipment is installed having a high earth leakage current (usually exceeding 3.5MA) including information technology equipment to BS EN 60950 and industrial control equipment where values of earth linkage current in normal service permitted by British Standards necessitate special precautions being taken in the installation of the equipment.

From a typical computer, for example this is likely to be approximately 2MA though computer manufacturers simply claim less than 3.5MA.

Most CPCs were not installed in anticipation of what is therefore in effect, a continuous current flowing through them. Any disconnection of the CPC can create dangerous situations.

This risk does not apply to individual items of equipment on a single dedicated circuit. However where several computers are connected to a final sub-circuit, the leakage current to earth is additive. Thus with regulation 607-02-06 having a threshold of IOMA, it may require an installation of only three items of equipment to come within its scope.

Danger

Consider 4 PCs on a typical radial circuit. Where an unexpected break occurs in any of those effected, the CPC would then rise to mains potential and the fault transferred to the other PCs.

The potential of the metal work on each could also rise to half mains potential. The integrity of the CPC must be maintained at all times to ensure safety Section 607 is intended to define how this may be achieved.

Section 607-02-07 of BS 7671 details some suggestions how to overcome these dangers.

In the majority of cases Technology Installation Services prefer the High Integrity Earthing Method detailed in:-

607-02-07 Item

The options available are:-

- (i) Single protective conductor with cross sectional area not less than 10mm².
- (ii) Separate duplicated protective conductors having independent connections complying with Regulation 526-01 each having a cross sectional area not less than 4mm².
- (iii) Duplicate protective conductors incorporated in a multicore cable together with the line conductors of the one of the protective conductors may be formed by a metallic armour sheath or braid incorporated in the construction of the cable and complying with regulation 543-02-05.
- (iv) Duplicate protective conductors formed by metal conduit, trunking or ducting complying with regulations 543-02-04 and by the conductor having a cross sectional area not less than 2.5mm² installed in the same enclosure and connected parallel with it.
- (v) An earth monitoring device which in the event of a discontinuity in the protective conductor automatically disconnects the supply of the equipment in accordance with regulations 412-02-01 to 26.
- (vi) Connection of the equipment to the supply by means of a double-wound transformer or other unit in which the input and output circuits are electrically separated, the circuit protective conductors is connected to the exposed-conductive parts of the equipment and to a point of the secondary winding of the transformer or equivalent device. The protective conductors between the equipment and the transformer shall comply with one of the arrangements described in items (i) to (iv) above except where regulation 607-02-05 applies each protective conductor mentioned in items (i) to (iv) above shall comply with the requirements.

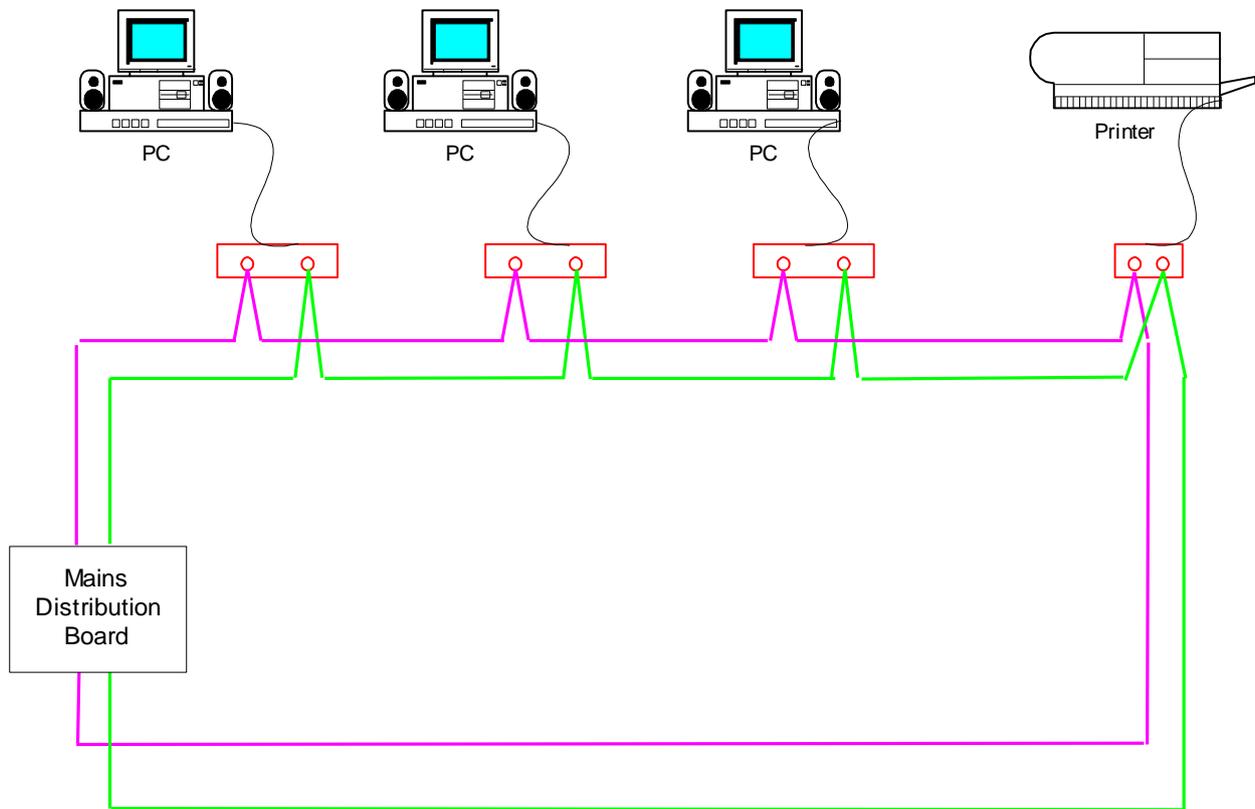
Typical

In many schools network installations are installed into UPVC trunkings.

In this case an independent earth ring should be installed and dual earthed 230 volt 13 amp sockets.

On a ring main circuit the earth CPC would need to be not less than 4mm².
 Optionally on new installation you could use a metal trunking or conduit with or parallel (earth) CPC not less than 2.5mm².

Fig 1.



- Ring Main Circuit wired in a 2.5 6242Y Twin and earth cable
- 4mm² High Intensity earth ring

This method means there is less chance of ever having a break in the earth.
 By disconnecting or breaking an earth at the socket location you are still able to maintain connectivity with the second earth.
 If you have a break in both earths with the ring earthing method you will maintain earth connections to both ends of the ring.

For more information read BS 7671 Section 607.

Note:

To comply with BS 7671, BS 6701 and the mandatory Construction Design Management Regulations CDM specifiers and installers require to carry out Risk Assessments and detail any deviations and hazards relevant to the installation.