



## Future Automation Enclosures BS 7671:2018 Chapter 41 use of RCBO and Zs Readings

***This synopsis is not a replacement for the official document. It is the responsibility of the installer to check and adhere to the relevant building, electrical and fire regulations from their published source.***

**Zs is the total earth fault loop impedance = Ze + (R1 + R2)**

*Other factors are added to the formula to account for variations in supply voltage and thermal effects on cables.*

Future Automation Enclosure RCBO versions include a suite of RCBOs one for each DIN module, see notes below on additional protection offered with RCBO's to satisfy requirements of Chapter 41 and Zs Earth Fault Loop Impedance.

### Excerpt from BS 7671 UK electrical Wiring Regulations Guide 18<sup>th</sup> (Page 63)

**411.4.204** Where an RCD is used to satisfy the requirements of Regulation 411.3.2.2, 411.3.2.3 or 411.3.2.4 the maximum values of earth fault loop impedance in **Table 41.5** may be applied for non-delayed RCDs to BS EN 61008-1 and BS EN 61009-1 for a nominal voltage U<sub>o</sub> of 230V. In such cases, an overcurrent protective device shall provide protection against overload current and fault current in accordance with Chapter 43.

**Table 41.5** allows a maximum permitted Zs of 1667 ohms for a 30mA RCD although Note 2 to Table 41.5 states that a value exceeding 200 ohms may not be stable.

**TABLE 41.5 –**  
Maximum earth fault loop impedance (Z<sub>s</sub>) for non-delayed and time delayed 'S' Type RCDs to BS EN 61008-1 and BS EN 61009-1 for U<sub>o</sub> of 230 V (see Regulation 411.5.3)

Rated residual operating current (mA)	Maximum earth fault loop impedance Z <sub>s</sub> (ohms)
30	1667*
100	500*
300	167
500	100

Disconnection shall be within the times stated in Table 41.1.

**NOTE 1:** Figures for Z<sub>s</sub> result from the application of Regulation 411.5.3(i) and (ii).

**NOTE 2:** \* The resistance of the installation earth electrode should be as low as practicable. A value exceeding 200 ohms may not be stable. Refer to Regulation 542.2.4.

*We still recommend getting your Zs as low as possible. As per the tables in the BS 7671 on-site guide, cross sectional area of cables makes a huge difference to the Zs and we would strongly recommend a minimum of 1.5mm<sup>2</sup> copper cable for lighting. This should be calculated using published formulas in the wiring regulations at the design stage.*

Most final circuit testing will need to be performed with the DIN Module bypassed or removed to avoid false measurements or damage to the module. Check all guidance from the DIN module manufacturer on testing and specification for relevant modules.