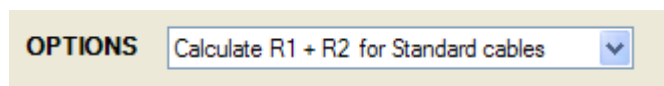


**1: Check disconnection time**

**Step 1.** From the Options drop-down box choose whether to use measured values of R1 + R2, calculate R1 + R2 values for Standard cables, calculate R1 + R2 values for Twin & Earth, or to calculate R1 + R2 for SWA cables using the Armouring as a CPC



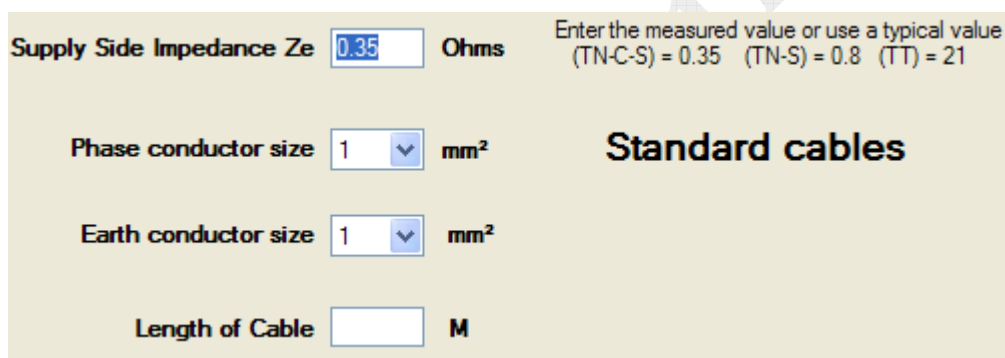
OPTIONS

**TO CALCULATE R1 + R2 FOR STANDARD CABLES**

**Step 2.** Enter the 'Supply side impedance Ze' into the box, if not known use one of the default values given for the correct supply type.

**Step 3.** Select the 'Phase conductor size' from the drop down box.

**Step 4.** Select the 'Earth conductor size' from the drop down box.



Supply Side Impedance Ze  Ohms Enter the measured value or use a typical value (TN-C-S) = 0.35 (TN-S) = 0.8 (TT) = 21

Phase conductor size  mm<sup>2</sup>

Earth conductor size  mm<sup>2</sup>

Length of Cable  M

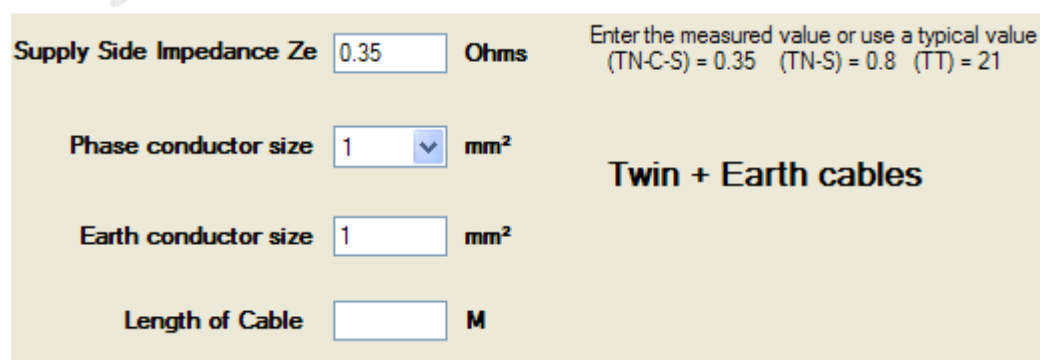
**Standard cables**

**Step 5.** Enter the 'Length of Cable' into the box. Go to **Step 7**

**TO CALCULATE R1 + R2 FOR TWIN & EARTH CABLES**

**Step 2.** Enter the 'Supply side impedance Ze' into the box, if not known use one of the default values given for the correct supply type.

**Step 3.** Select the 'Phase conductor size' from the drop down box, the Earth conductor size will automatically be entered.



Supply Side Impedance Ze  Ohms Enter the measured value or use a typical value (TN-C-S) = 0.35 (TN-S) = 0.8 (TT) = 21

Phase conductor size  mm<sup>2</sup>

Earth conductor size  mm<sup>2</sup>

Length of Cable  M

**Twin + Earth cables**

**Step 5.** Enter the 'Length of Cable' into the box. Go to **Step 7**

## TO CALCULATE R1 + R2 FOR SWA CABLES using Armour as a CPC

**Step 2.** Enter the 'Supply side impedance Ze' into the box, if not known use one of the default values given for the correct supply type.

**Step3.** Select either PVC or Thermosetting SWA (Thermosetting SWA is calculated to a max operating temperature of 70°C)

**Step 4.** Select the 'SWA – number of cores' from the drop down box.

**Step 5.** Select the 'SWA – conductor size' from the drop down box.

The screenshot shows a web form with the following fields and options:

- Supply Side Impedance Ze:** Input box with value 0.35, unit Ohms. Text: "Enter the measured value or use a typical value (TN-C-S) = 0.35 (TN-S) = 0.8 (TT) = 21"
- SWA-number of CORES:** Dropdown menu with value 2, unit Core.
- SWA-Conductor size:** Dropdown menu with value 1.5, unit mm<sup>2</sup>.
- SWA cables:** Radio buttons for PVC and Thermosetting @ 70°C. Thermosetting is selected.
- Using the steel wire armour as a CPC with the correct Glands and installed correctly !** (Red text)
- More Info** (Blue button)
- Length of Cable:** Input box, unit M.
- minimum CSA of steel CPC to comply with Table 54.7:** Input box with value 3.4, unit mm<sup>2</sup>.
- Actual armour CSA from BS5467:** Input box with value 16, unit mm<sup>2</sup>.

**Step 6.** Enter the 'Length of Cable' into the box. Go to **Step 7**

## TO USE MEASURED VALUES OF R1 + R2

**Step 2.** Enter the 'Supply side impedance Ze' into the box, if not known use one of the default values given for the correct supply type

**Step 3.** Enter your measured value of R1 + R2 in the box.

The screenshot shows a web form with the following fields:

- Supply Side Impedance Ze:** Input box with value 0.35. Text: "Enter the measured value or use a typical value (TN-C-S) = 0.35 (TN-S) = 0.8 (TT) = 21"
- Measured R1 + R2 value:** Input box.

Go to **Step 7**

**Step 7.** Choose a 'Protective device type' from the drop down box.

**Step 8.** Select a 'Rating' value for the chosen protective device from the drop down box.

Length of Cable  M

Protective device   Amps

**Step 9.** Use the drop down box to select the required 'Max Disconnection time' as stated in the 17<sup>th</sup> edition Regulations.

**Step 10.** Use the drop down box to select the 'Max cable operating temp' depending on the type of cable insulation. (SWA cable is set at 70°C MAX)

MAX Disconnection time  Regulation 411.3.2.2 (TABLE 41.1) or 411.3.2.3

MAX cable operating temp  PVC = 70 °C THERMOSETTING = 90 °C : TABLE 52.1

**Step 11.** Choose either to use the 80% values of Zs for comparison as per APPENDIX 12 or the Maximum permissible values of Zs.

Value of Zs for comparison  80% Values  Max permissible Values APPENDIX 12

**Step 12.** Press the 'Calc' button to calculate the actual earth fault loop impedance Zs, and to compare this value with the choice of Zs for comparison.

Earth Fault Loop Impedance Zs

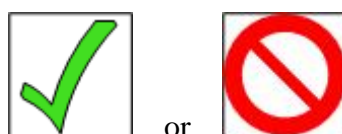
Earth Fault Loop Current  Amps

PFC  KA

Maximum permitted Zs  Ohms

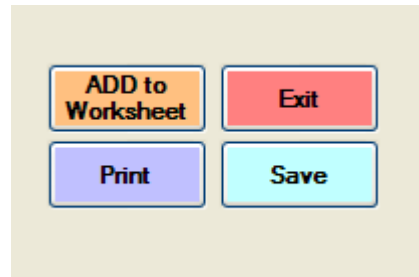
**Step 13.** If the calculated (or measured) value of earth fault loop impedance Zs is less than the Max or 80% permitted value (or measured value) then a TICK icon and message will show

If the calculated value of earth fault loop impedance Zs is greater than the Max or 80% permitted value then a NO icon and message will show



If at any time you change any of the values, you will have to recalculate the Disconnection time again.

**Step 14.** To print out a copy of the calculations press the '**Print**' button. This will display the Print page.



The '**Print**' button will only show if the calculations have been done first!

The '**Save**' button will allow you to save a copy of the results as a TEXT file. The TEXT file can be opened with most word processor programs and can be 'copied and pasted' into reports or write-ups. Wherever possible, the relevant 17<sup>th</sup> edition Regulations are quoted

This software is 'as is'; I accept NO responsibility for ANY CALCULATIONS, RESULTS or WORK based on this software.

**If in doubt consult a qualified Electrician**