

MAXIMUM EARTH FAULT LOOP IMPEDANCE VALUES FOR OVERCURRENT PROTECTIVE DEVICES IN COMMON USE, FOR FAULT PROTECTION

For fault protection, the limiting values of earth fault loop impedances, Z_s , are given in Tables 41.2, 41.3 and 41.4 of BS 7671, for many commonly-used overcurrent protective devices.

The values given in those tables are the limits that apply under earth fault conditions, when the temperature of the conductors can be expected to be higher than when testing is undertaken (usually under no-load conditions). Consequently, the values of earth fault loop impedance when measured at ambient temperature should be lower than the limits set out in BS 7671.

It is generally accepted that, where the measured earth fault loop impedance of a circuit is not greater than 80% of the relevant limit specified in BS 7671, the impedance can be expected to be sufficiently low under earth fault conditions to meet the relevant limit specified in BS 7671, and for the protective device to automatically disconnect within the time specified.

The following table gives the limiting values of earth fault loop impedance when measured at ambient temperatures up to 20°C. The limits on measured values are 80% of the values given in BS 7671, rounded down. The boxes marked 'N/A' (Not Applicable) indicate either that the overcurrent protective device is not commonly available or that, by virtue of its characteristics, the device is not generally appropriate for fault protection.

The impedance values are based on the 'worst case' limits allowed by BS 7671 and, in certain cases, where the manufacturer of the protective device claims closer limits of fault current necessary for operation of the device than allowed for by the Standard, the values may be modified accordingly.

Where the measured value of the earth fault loop impedance exceeds the relevant tabulated value below, further investigation will be necessary to evaluate the particular circumstances to confirm that compliance with BS 7671 has been achieved.

Limiting values of measured earth fault loop impedances for common overcurrent protective devices, for fault protection, operating at 230 V based on 80 % (approx) of the values given in BS 7671															
Rated current (A)	Fuses										Circuit-breakers to BS 3871 or BS EN 60898				
	BS 88 (gG) Parts 2 and 6		BS 1361 or BS 1362		BS 3036		BS 88-2 Fuse systems E (bolted) and G (clip in)		BS 88-3 Fuse system C		Type 1	Type 2	Type B	Types 3 and C	Type D
	0.4 s	5 s	0.4 s	5 s	0.4 s	5 s	0.4 s	5 s	0.4 s	5 s	0.4 s and 5 s				
3	N/A	N/A	13.12	18.56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12.26	N/A	N/A
5	N/A	N/A	8.36	13.12	7.66	14.16	N/A	N/A	8.36	12.26	9.20	5.26	N/A	3.68	1.84
6	6.82	10.80	N/A	N/A	N/A	N/A	6.57	10.24	N/A	N/A	7.66	4.37	6.13	3.06	1.54
10	4.08	5.94	N/A	N/A	N/A	N/A	3.91	5.75	N/A	N/A	4.60	2.63	3.68	1.84	0.92
13	N/A	N/A	1.94	3.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	N/A	N/A	2.62	4.00	2.04	4.28	N/A	N/A	N/A	N/A	3.06	1.75	N/A	1.23	0.61
16	2.16	3.34	N/A	N/A	N/A	N/A	2.05	3.34	1.94	3.29	2.87	1.64	2.30	1.15	0.58
20	1.42	2.33	1.36	2.24	1.41	3.06	1.42	2.36	1.63	2.70	2.30	1.31	1.84	0.92	0.46
25	1.15	1.84	N/A	N/A	N/A	N/A	1.08	1.84	N/A	N/A	1.84	1.04	1.47	0.74	0.37
30	N/A	N/A	0.92	1.47	0.87	2.11	N/A	N/A	N/A	N/A	1.53	0.87	N/A	0.61	0.31
32	0.83	1.47	N/A	N/A	N/A	N/A	0.83	1.47	0.77	1.31	1.44	0.82	1.15	0.58	0.29
40	0.65	1.08	N/A	N/A	N/A	N/A	N/A	1.08	N/A	N/A	1.15	0.65	0.92	0.46	0.23
45	N/A	N/A	0.46	0.77	0.47	1.27	N/A	N/A	N/A	0.83	1.02	0.58	0.82	0.41	0.20
50	0.48	0.83	N/A	N/A	N/A	N/A	N/A	0.83	N/A	N/A	0.92	0.52	0.73	0.37	0.18
60	N/A	N/A	N/A	0.56	N/A	0.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
63	0.36	0.66	N/A	N/A	N/A	N/A	N/A	0.66	N/A	0.58	0.72	0.41	0.58	0.29	0.14
80	0.24	0.46	N/A	0.40	N/A	N/A	N/A	0.46	N/A	0.42	0.57	0.32	0.46	0.23	0.11
100	0.18	0.34	N/A	0.29	N/A	0.42	N/A	0.37	N/A	0.32	0.46	0.26	0.37	0.18	0.09
125	0.14	0.26	N/A	N/A	N/A	N/A	N/A	0.27	N/A	N/A	N/A	N/A	0.30	0.14	0.07
160	0.11	0.20	N/A	N/A	N/A	N/A	N/A	0.22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
200	0.8	0.15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A