EARTH ELECTRODE TESTING: METHOD E1 AND THE GEOMETRY

WHERE DOES THE SPIKE GO?

EARTH ELECTRODE TESTING: METHOD E1 AND THE GEOMETRY

Guidance Note 3 · 2.6.13 · pp.78–79 . On a **TT** system the DNO provides no earth, so the electrode has to be proved on its own. **Method E1 is the most accurate** — and the most time consuming.

✋ **E1 is a DEAD test.** You disconnect the earthing conductor, so the main switch must be isolated and **locked off**. Leave the earthing conductor connected and every circuit in the board gives you a parallel path that ruins the reading.

The layout, with the current spike 12 m from the electrode as the example:

```
CURRENT SPIKE 12 M AWAY
Distance to the current spike  = 12 m
Voltage spike, first position   = halfway = 6 m

Then move the voltage spike 10% of the electrode-to-current-spike distance ea
  10% of 12 m = 1.2 m  →  readings 2 and 3, at 4.8 m and 7.2 m
```

The book's example moves the spike 3 m

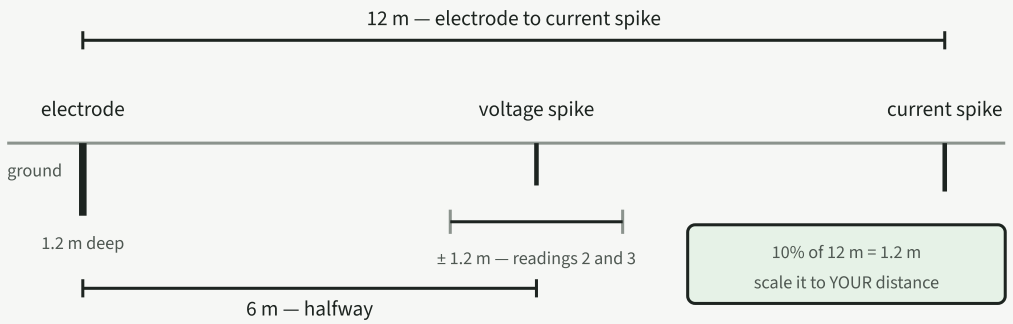
because its current spike is 30 m away: 10% of 30 m. Same rule — scale the 10% to **your** electrode-to-current-spike distance, not the diagram's.

You need the ground for it.

The book's example puts the current spike 30 m from the electrode, which is why TT tends to be rural.

The kit.

Not earth rods — **T-bars**, knocked in just far enough to clamp onto. The **longest (red) lead** goes to the current spike, the **blue** to the voltage spike, the **green** straight onto the electrode. It is expensive; do not buy it unless you really do electrode testing.



A dead test — the earthing conductor comes off, so the main switch is isolated and locked. The book's example has the current spike 30 m away, so it moves 3 m; scale the 10% to the distance you actually have.

AVERAGING THE THREE READINGS, AND THE ACCURACY RULE

Three readings, repositioned each time, then averaged.

THE WORKED EXAMPLE

```
Reading 1 = 100 Ω
Reading 2 = 101 Ω
Reading 3 = 99.5 Ω

Total     = 300.5 Ω
Average   = 300.5 ÷ 3 = 100.17 Ω
```

The book does not accept readings that differ by **more than 5 per cent**.

IS IT ACCEPTABLE?

```
Guidance Note 3 · p.79: the largest deviation of any reading
from the average, as a % of the average.
Reading furthest from the average = 101 Ω
101 - 100.17 = 0.83 Ω
0.83 ÷ 100.17 = 0.008, so 0.8%
Accuracy ≈ 1.2 × 0.8% = about 1%
Readings differing by more than 5% are not accepted — this is well inside.
```

> **If you are outside 5%, change the test, not the result.**
> Extend the distance between the electrode and the current spike, or drive the spikes in deeper. A different method, such as E3, is the other option, though it may not be as accurate.

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