TWO-WIRE OR THREE-WIRE: THE LOOP IMPEDANCE TEST

TWO WIRE OR THREE WIRE?

Back over the earth fault loop impedance test, and the decision that drives it:

TEST	WHEN	CURRENT
Two-wire high current	Always — **unless** there is an RCD in circuit	Enough to need care (see below)
Three-wire non-trip	Where an RCD or RCBO is present	Under **15 mA**, so the RCD does not trip

✋ **Above 15 A you can trip small breakers.** If your tester injects more than about 15 A on the high-current test, it can trip a low-rated device — a 6 A lighting circuit, or a 3 A dedicated smoke alarm circuit.

Why 15 mA for the non-trip test.

Think about the RCD half-times test: at half the rated residual current you expect it **not** to trip. Keeping the loop test current below 15 mA keeps it under the trip threshold of a 30 mA device for the same reason.

There is also a **two-wire non-trip** test on some instruments — no neutral lead, measuring across line and earth of the supply only. The advantage is that you can take a Z_s at a lighting point without reaching in among exposed conductors. The trade-off is that it is **less accurate** and more prone to error, and it is not on every tester.

The instrument tells you if the leads are wrong.

On the loop test the display carries indicator circles. Swap a lead and they will not line up — some instruments add a light or a repeated beep. It is telling you either that the probes are the wrong way round or that one has not made proper contact.

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