# INSULATION RESISTANCE WORKS IN PARALLEL TOO

## 25, 50 AND 100 MEGOHMS. WHAT'S THE TOTAL?

Circuits are wired in parallel, so when you test more than one at a time the insulation resistance values combine in parallel as well.

$$1 \div R_T = 1/R_1 + 1/R_2 + 1/R_3 \ldots$$

### THREE CIRCUITS READING 25, 50 AND 100

```
1/25 + 1/50 + 1/100
  = 0.04 + 0.02 + 0.01
  = 0.07

R_T = 1 ÷ 0.07 = 14.29
```

🖐 **Reciprocate your answer.** This is the step everyone forgets. If your answer comes out as 0.07, you have stopped one step early — you still have to do 1 ÷ 0.07. It is the thing most people forget with parallel resistances.

### A SANITY CHECK ON LENGTH — CONDUCTOR RESISTANCE, NOT INSULATION

```
Three conductors of 10 Ω each in parallel  → 10 ÷ 3 = 3.33 Ω
Double the length, so each becomes 20 Ω  → 20 ÷ 3 = 6.67 Ω

For conductor resistance, doubling the length doubles the result.
Insulation resistance goes the other way: a longer cable has more
insulation in parallel, so doubling the length roughly halves it.
```

**Continuity and insulation resistance want opposite things.**
Continuity wants the conductors connected, at the lowest resistance you can get. Insulation resistance wants them **completely separate** — effectively an open circuit, with nothing passing between them at all.

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