DEVICES AND RCD TYPES

TYPE AC, A, F OR B. WHICH RCD?

CHAPTER 53: DEVICES FOR PROTECTION

Chapter 53 covers devices for **protection, isolation, switching, control and monitoring**. Know which job each device does — the exam tests exactly that distinction.

JOB	DEVICE
Overcurrent protection	Circuit breaker, fuse, RCBO
Fault protection by ADS	The overcurrent device — or an RCD on a TT system
Additional protection	30 mA RCD
Fire protection	RCD not exceeding 300 mA · AFDD
Monitoring	RCM — residual current monitor

§ **531** — an **RCD shall disconnect all live conductors** of the circuit. Look at the top of any RCD: line and neutral both land on it, and both are broken.

And a related one: the **protective conductor current shall not contribute** to the residual current measurement. An RCD compares line and neutral only.

Chapter 53 · protection, isolation, switching, control, monitoring

531 · devices for fault protection by ADS

RCDS: TYPES, THE 30 % RULE AND TABLE 41.5

TYPES OF RCD

🖐 **Don't confuse RCD types with breaker types.** Circuit breakers have only **B, C and D**. RCDs have **AC, A, F and B** — and an **S type**, which is time-delayed.

RCD types are marked on the device as **pictograms**, not letters — a plain sine wave for type AC, a sine wave plus a pulsating DC symbol for type A, and so on. Guidance Note 3 shows them in **Figure 2.32** (p.97); BS 7671 (531.3.3, pp.165–166) describes Types AC, A, F and B in words only: a Type A still works with smooth DC up to **6 mA**, a Type F up to **10 mA**, and a Type B up to **0.4 × $I_{\Delta n}$ or 10 mA**, whichever is higher. Type AC is effectively obsolete; type A is the normal choice now.

THE 30 % EARTH LEAKAGE RULE

Keep the normal standing leakage on one RCD below **30 % of its rated residual current**, or you get nuisance tripping. An RCD may trip at **any value above 50 %** of its rating (531.3.2(c), p.165).

HOW MUCH LEAKAGE A 30 MA RCD TOLERATES

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30 % of 30 mA = 9 mA

That is 9 mA across every circuit on that RCD,
not 9 mA per circuit.

For scale: a single computer can leak about 2 mA.
Four computers (8 mA) and you're nearly there;
five (10 mA) and you're over.
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> This is why a board with ten circuits on one RCD is asking for nuisance tripping, and why splitting circuits across two RCDs — or using RCBOs — is better design.

TABLE 41.5 AND THE 50 V TOUCH VOLTAGE

On a **TT system** the RCD is doing **fault protection**, because the earth electrode gives a much higher resistance than a supplier's earth. **Table 41.5** (p.77, under 411.5.4 in Chapter 41) gives the maximum earth fault loop impedance Z_s for each RCD rating.

$I_{\Delta N}$	MAX Z_S	CHECK
30 mA	1667 Ω	0.03 × 1667 = 50 V
100 mA	500 Ω	0.1 × 500 = 50 V
300 mA	**167 Ω**	0.3 × 167 = 50 V
500 mA	100 Ω	0.5 × 100 = 50 V

> = Every row is the same sum: **$Z_s \times I_{\Delta n} = 50$ V**. The whole table exists to keep touch voltage at or below **50 V**. Ohm's law, nothing more.

> **The Δ symbol.**
> $I_{\Delta n}$ is the **rated residual operating current** — the triangle is delta, meaning difference. Its definition is in Part 2.

Table 41.5 · p.77 · maximum Z_s per RCD rating

531.3.2(c) · p.165 · standing leakage ≤ 30 % of $I_{\Delta n}$ · may trip above 50 %

531.3.3 · pp.165–166 · RCD types AC, A, F and B in words

Guidance Note 3 · Figure 2.32 · p.97 · RCD type pictograms

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