CABLE CALCULATION: THE COOKER CONTROL UNIT AND THE CONSUMER UNIT

IS A 45 AMP COOKER SWITCH A PROTECTIVE DEVICE?

THE ACCESSORIES: COOKER CONTROL UNIT AND OUTLET

Cooker control unit (cooker switch)

- Two types: a **double-box size** with the big red switch **and a socket-outlet** (what the client asked for), or a **single-module** switch on its own.
- The cooker and the socket are switched **independently**. Either can be on while the other is off.
- The socket is part of the **cooker circuit**, not the kitchen ring. If someone turns off the ring to "isolate the sockets", this socket is **still live**.
- It's marked **"Cooker"**. Switches for equipment that isn't obvious must be **labelled** (Chapter 51). A row of unlabelled switches above a worktop (fridge, dishwasher, washing machine) should be labelled if it isn't easy to tell which is which.
- It's a **45 A double-pole switch**. A rating on a switch means its contacts can switch that much current (thicker copper, a stiffer action). It is **not** a protective device and has no fuse inside. A light switch rated 10 A is the same idea.

Cooker outlet ("cooker nose")

- A connection point between the fixed wiring and the cooker. Think of it as "a glorified connector block". The front plate unscrews.
- It goes on a **deep single box**, generally **45 mm** deep, because the cables are large.
- The supply cable comes down the chase from the **load side** of the control switch. The cooker's cable is held by the **cable grip** bar. So each terminal ends up with **two conductors**: one in from the switch, one out to the cooker.
- If the terminals are marked L, N and earth, **follow the manufacturer's instructions**. That's a Part 1 requirement. The one thing you must never do is put a line or neutral on the **earth terminal**, because it's bonded to the metal frame and the box.

> **BS 7671** · Chapter 51 · labelling of switches and equipment

> **BS 7671** · Part 1 · follow manufacturers' instructions (Reg 134.1.1)

THE CONSUMER UNIT: RCDS, SPD, RCBOS AND AFDDS

- **Non-combustible**: Chapter 42 requires new consumer units in dwellings to be made of, or enclosed in, non-combustible material (Reg 421.1.201). You could put a plastic

board inside a non-combustible enclosure, but it's easier to just buy a metal board.

- **Dual RCD board**: a main switch and two **30 mA Type A** RCDs, each protecting a group of circuit breakers. Type A is marked with a sine wave **and** a pulsed wave symbol. Type A detects AC **and** pulsating DC residual currents.
- **Type AC** RCDs are now very unlikely to be installed. Chapter 53 (Reg 531.3.3) only allows them for **fixed equipment with no DC component**. In a modern home that's almost impossible. Type A (or Type B, or Type F) is used instead.
- **Protected side / non-protected side**: the ways covered by an RCD are the "protected" side. The ways fed only through the **main switch** are often called the "non-protected" side. The main switch isn't a protective device, so the next device upstream is the DNO's main fuse.
- **Type 2 SPD** (surge protective device) sits on the non-protected side next to the main switch, with a neutral to the neutral bar and an earth to the earth bar. After a surge (e.g. a lightning strike) its cartridge shows **red** and is simply replaced. The installation still works without it. It's worth the client checking it after a storm.
- **RCBO**: you connect **both** line and neutral of the circuit to the RCBO, and its neutral flying lead goes to the neutral bar. Examples: a **6 A Type B RCBO, 30 mA**, and a **32 A Type B RCBO, 30 mA with an AFDD** built in.

AFDDs (arc fault detection devices)

Reg 421.1.7 makes AFDDs **required** for **single-phase AC final circuits supplying socket-outlets rated up to 32 A** in:

- **Higher-risk residential buildings** (over **18 m** in height or in excess of **six storeys**, whichever is met first),
- **Houses in multiple occupation (HMOs)**,
- **Purpose-built student accommodation**, and
- **Care homes**.

The scenario is an HMO on purpose. Because the client wants a **socket on the cooker switch**, this cooker circuit now needs an AFDD. An AFDD RCBO costs several times as much as a plain RCBO.

> **BS 7671** · Reg 421.1.7 · where AFDDs are required · **p.93**

> **BS 7671** · Chapter 42 · non-combustible consumer units

> **BS 7671** · Chapter 53 · where a Type AC RCD may be used

> **Sparky's tip: one RCBO per circuit**
> For new or replacement consumer units, recommend a board with **just a main switch** and an **RCBO for every circuit**, not a dual RCD board. With lots of people working from home, one earth fault on a dual RCD board takes out **every circuit on that RCD** (kitchen ring, downstairs ring, upstairs ring…). With RCBOs, only the faulty circuit goes off. It costs the customer more, but it cuts unwanted tripping (Chapter 53 covers this). Many RCBOs can now have an AFDD built in.

Free section from Sparky Study Notes. The full Level 3 notes, 1,463 practice questions and the video lessons: sparkystudynotes.co.uk