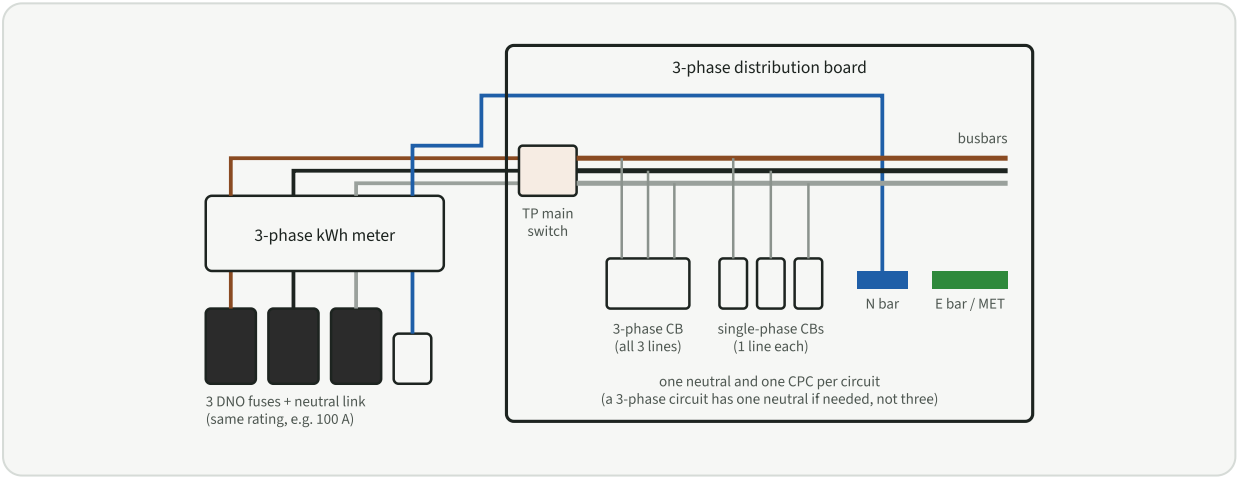
THREE-PHASE SUPPLIES AND BOARDS

STAR OR DELTA, AND HOW DOES AN RCD'S TEST BUTTON WORK?

- A generator has **3 windings**, making 3 sine waves **120° apart**. Line to neutral is **230 V** on each phase. Line to line is **400 V**, not 460 V, because the phases never peak together.
- **Star** (the transformer secondary) has a **star point**, so it gives a **neutral**, which carries any out-of-balance current when each phase feeds different loads. **Delta** (usually the primary) has **no star point**, so there is **no neutral**.
- Three-phase is mainly **commercial and industrial** (big machinery, plant, welders). Very large sites may take an 11 kV supply. One transformer can feed a street, a village or a single factory. A house normally takes **one phase**, and you usually won't know which.



- **Triple-pole (TP) main switch:** switches off **all three** phases at once, so you can't turn off just one. A **TP&N** (4-pole) switch also breaks the neutral.
- You can mix **three-phase** and **single-phase** circuits on one board. Example: 4 three-phase breakers fill 12 ways, or 2 three-phase plus 6 single-phase uses the same space for **8 circuits**.
- For a whole supply there are **3 DNO fuses** (all the same rating: 63, 80 or 100 A), a **three-phase meter** with L1, L2, L3 and N in and out, and an isolator. The **earth doesn't go through the meter**.
- **Isolation:** for a consumer unit change with no isolator, the **DNO** must pull the fuse. For work on one circuit, lock off that breaker or the main switch. Safe isolation is covered in detail later.
- **Mixed colours:** when joining old and new three-phase cables, e.g. red→brown, yellow→black, blue→grey, black→blue, make sure **every conductor is correctly identified**. A **caution label** is no longer required by BS 7671 (Reg 514.14 was deleted in A2:2022), though you can still fit one.

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