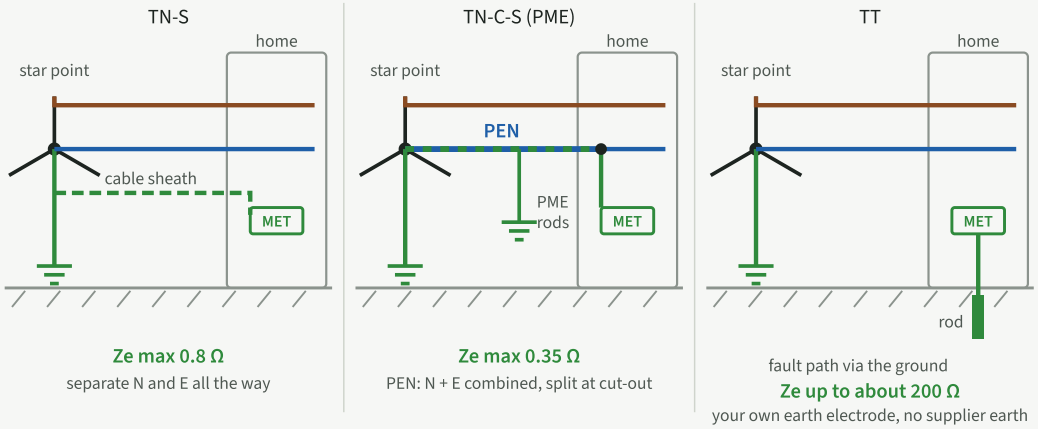
EARTHING SYSTEMS: TN-S, TN-C-S, TT

TN-S, TN-C-S OR TT. HOW DOES FAULT CURRENT GET HOME?

Every building is supplied from a **transformer**, and every transformer has a **star point**. That star point is the **source of earth** for the installation. Fault current has to get **back to the star point** for the protective devices to work. How it gets back depends on the earthing system.



Simplified: the star point is on the left of each drawing and the home is on the right. TN-S and TN-C-S are the focus here; TT is shown for comparison.

SYSTEM	HOW THE EARTH GETS BACK TO THE STAR POINT	MAX ZE
TN-S	Neutral and earth are **separate** all the way. The earth is the **metal sheath or armour** of the supply cable. Common in older properties.	0.8 Ω
TN-C-S also called PME	Neutral and earth are **combined** in the underground supply cable, in one conductor called the **PEN conductor** (protective earth neutral). They're **separated** at the cut-out. It's the most common system in the UK, very reliable, with very low resistance to earth.	0.35 Ω
TT	No earth from the supplier. The installation has its **own earth electrode** (rod), and fault current returns **through the ground**. Used in rural areas.	up to about 200 Ω (your own electrode)

Our first installations are drawn as **TN-S**, but it makes **no difference** to the bonding rules whether it's TN-S or TN-C-S. The difference only matters for **open PEN faults** (section 8), which can only happen on TN-C-S.

Electrician's Guide to the Building Regs · Supply systems: expected maximum Ze values (TN-C-S 0.35 Ω, TN-S 0.8 Ω) · **p.53**

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