# MCB Tripping Curves Explained — B, C and D Selection with Brand Cross-Reference

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What B, C and D curves actually trip at (3–5, 5–10 and 10–20 × In), how to choose for cable runs, motors and transformers, and the cross-reference between the big MCB families — ABB S200, Schneider Acti9 iC60 and Siemens 5SL — with breaking-capacity grades.

## What the curve letter sets

Every MCB trips two ways: a thermal element handles sustained overload (the same for all curves), and a magnetic element fires instantly on short circuit. The curve letter fixes where the instant trip begins, as a multiple of rated current In:

Curve | Magnetic trip | Built for | Watch out |

B | 3–5 × In | Long cable runs, resistive loads, sockets in dwellings — trips on the smallest fault current | Nuisance-trips on inrush (motors, many LED drivers) |

C | 5–10 × In | The industrial default: mixed and moderately inductive loads | Needs more fault current at cable end to trip instantly — check loop impedance on long runs |

D | 10–20 × In | Transformers, welding sets, motor groups with heavy inrush | Demands the highest fault current for instant disconnection; verify earth-fault clearance times |

Same-rating, different-curve breakers are not interchangeable in either direction without checking: a C16 swapped to B16 may nuisance-trip the machine; B16 to C16 may stop a long lighting radial from meeting disconnection times.

## The big three families, side by side

| ABB S200 | Schneider Acti9 iC60 | Siemens 5SL |

Breaking grades | S201/S202/S203/S204 by poles; 6 kA standard, S200M 10 kA | iC60N 6 kA · iC60H 10 kA · iC60L higher at common ratings | 5SL6 = 6 kA · 5SL4/5SL7 shift the class |

Curves stocked | B and C widely (S201-B10, S203-C40) | B/C/D (iC60N 3P C63) | B/C (5SL6363-7 C63 3P) |

Reference anatomy | S + poles + curve+rating: S203-C40 | family + grade, curve+rating in the suffix: iC60N C63 | 5SL + series + digits; decoded in the Siemens decoder |

Catalogue depth | ~350 items | ~1,500 Acti9 items | 5SL range + SENTRON |

Cross-brand replacement at the same rating, curve and breaking capacity is routine in general distribution — DIN-rail pitch and busbar comb systems are where the brands differ, so a mixed board keeps one maker per comb section. Coordination with upstream MCCBs is its own discipline: see the selectivity guide.

## Five-second selection recipe

Resistive/lighting, long run !’ B at the cable's rating.

General industrial mix !’ C (the default for a reason).

Transformer, welding, grouped motors !’ D, then verify fault-loop current covers 10–20 × In.

Breaking capacity "e the board's prospective fault current — grade letter (N/H, 6/10 kA) before anything else.

Poles: switch every live conductor the system earths demand (1P+N and 3P+N variants exist across all three families).

Frequently asked questions
What is the difference between a B16 and C16 breaker?Only the instant-trip threshold: B fires at 3–5 × 16 A, C at 5–10 × 16 A. Thermal overload behaviour is identical — the choice is inrush tolerance versus minimum fault current.When should a D-curve MCB be used?Where inrush regularly exceeds ten times rated current — transformers, welding equipment, motor groups — and the supply can still deliver the 10–20 × In needed for instant tripping.Is an ABB S201-C16 equivalent to a Schneider iC60N C16?Functionally yes at 6 kA: same rating, curve and class trip alike. Physically they differ in comb-busbar and accessory systems, so boards stay single-brand per busbar section.What does the N in iC60N mean?The breaking-capacity grade — 6 kA; H raises it to 10 kA and L beyond at common ratings. The curve letter and ampere rating follow separately.Can I put a C-curve in place of a B-curve to stop nuisance tripping?Only after checking the circuit's earth-fault loop: the C curve needs roughly double the fault current for instant disconnection, which long runs may not deliver.

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