Motor-Protection Circuit Breakers — Setting Ranges and the GV2, PKZM0 and 3RV Cross-Reference

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How MPCBs combine an adjustable thermal overload with a fixed magnetic short-circuit trip, why selection is by setting range around the motor's full-load current, and the frame logic of the three dominant families — Schneider GV2ME, Eaton PKZM0 and Siemens 3RV2 — with stocked examples per range.

What an MPCB does that an MCB cannot

A motor-protection circuit breaker packs two protections into one DIN-rail device: an adjustable thermal element dialled to the motor's full-load current (overload, phase-loss sensitivity on the three-pole versions), and a fixed magnetic trip set high — typically around 13 × the upper range current — so starting inrush passes but a short circuit does not. A B- or C-curve MCB cannot do this job: its thermal element is not calibrated or adjustable for motor duty (see the MCB curve guide for that side of the fence). Standard trip class is 10; the dial is set to the nameplate FLC, not the cable rating.

Selection is a range question, not a size question

All three big families step through overlapping current windows on a common frame, so selection is simply: find the window that brackets the motor's FLC, ideally with the value sitting in the upper two-thirds of the dial.

Motor FLC example | Schneider | Eaton | Siemens |

5.5 A (2.2 kW/400 V) | GV2ME10 (4–6.3 A) | PKZM0-6.3 (4–6.3 A) | 3RV2011 with 4.5–6.3 A window |

11 A (5.5 kW/400 V) | GV2ME16 (9–14 A) | PKZM0-12 (8–12 A) | 3RV2011-1KA10 (9–12.5 A) |

16 A (7.5 kW/400 V) | GV2ME20 (13–18 A) | PKZM0-16 (10–16 A) | 3RV2011-4AA10 (14–20 A) |

The window boundaries do not line up across makers — a motor at 12.8 A fits GV2ME16 and 3RV2011-4AA10 but falls between PKZM0-12 and PKZM0-16's sweet spots — which is exactly why cross-brand substitution needs the FLC, not the old type number alone. Frames extend upward (GV3, PKZM4, 3RV2 S0/S2) on the same logic.

Building the complete starter

MPCB + contactor as a combination starter: link modules join the pair mechanically and electrically (GV2ME combination example); Eaton's PKZM0 side runs the same game with wiring modules, and about 115 PKZM items are stocked including the adapters and enclosures.

Auxiliary and trip-signal contacts mount front or side and are frame-specific — roughly 550 3RV items in the catalogue are exactly these accessories, locks and enclosures.

Type 2 coordination tables published by each maker name the exact MPCB-plus-contactor pairs tested to stay serviceable after a short circuit — worth honouring on anything that must restart quickly; background in the selectivity guide.

Contactor sizing for the switching half is its own discipline: AC-1 vs AC-3 explained here.

Send the motor's nameplate FLC and voltage — or the full reference off a failed unit, decoded via the Siemens and Schneider guides — and the quotation returns the in-range device plus its matching accessories within 24 hours.

Frequently asked questions
What setting should the MPCB dial be on?The motor's nameplate full-load current — not the cable rating and not the breaker's maximum. Phase-loss sensitivity and overload timing are calibrated around that value.Can an MCB replace a motor-protection breaker?No — an MCB has no adjustable thermal element calibrated for motor duty and no phase-loss sensitivity; it protects the cable, not the windings. The reverse substitution also fails, since an MPCB's magnetic trip sits far above a C-curve's.Is GV2ME16 the same as PKZM0-16?No — the digits mean different things: GV2ME16 covers 9–14 A while PKZM0-16 covers 10–16 A. Cross-reference by the motor's actual full-load current, never by the number in the type code.What is Class 10 trip?The overload speed class: tripping within 10 seconds at 7.2 × the set current from warm — the standard grade for ordinary starting duty; Class 20 suits heavy, long starts.Do I still need fuses in front of a PKZM0 or GV2? Within the device's published breaking capacity at the installation's fault level, no — these are breakers in their own right. Above it, or where Type 2 coordination tables say so, a back-up fuse or upstream breaker is specified.

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