Siemens Fuse Systems — 3NA, 3NE SITOR, 3NW Explained

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The Siemens low-voltage fuse families decoded for buyers and panel builders: 3NA8 LV HRC (NH) gG links and their sizes 000 to 3, 3NE SITOR semiconductor fuses (aR, gR, gS) that protect drives and rectifiers, 3NC cylindrical SITOR, the 3NW cylindrical 10x38 system with its holders and auxiliary switches, what the operating classes gG, aM, aR, gR and gS really promise, how to read an existing link and reorder correctly, and the cross-reference logic to Bussmann and Mersen.

The short version

Siemens organises its LV fuse programme in families by construction: 3NA8 — the NH (LV HRC) blade-type gG links in sizes 000/00/1/2/3 that protect feeders and distribution; 3NE — SITOR semiconductor fuses (blade and bolt styles) for drives, soft starters and rectifiers; 3NC — SITOR in cylindrical formats; 3NW — the cylindrical 10x38 system of links, modular holders and auxiliary switches; plus NH bases, holders and the SENTRON switch-disconnectors that carry them.
The operating class on the link is the contract: gG = full-range general protection (cables, feeders); aM = motor-circuit backup (short-circuit only — something else must handle overload); aR = semiconductor backup, blisteringly fast on short circuit but no overload protection; gR = full-range semiconductor; gS = semiconductor plus cable protection in one. Matching class to duty is the whole game — an aR link in a feeder position leaves overloads unprotected, a gG link ahead of a drive lets the IGBTs die first.
A drive is not protected by its breaker alone. Semiconductors fail in milliseconds; only a semiconductor-class fuse (SITOR territory) has the I²t to clear faults before the power stage does. VFD input protection per the drive maker's list is the one place "equivalent" needs letter-for-letter care — the drive manuals name exact fuse types for a reason.
Reordering is nameplate reading: family (3NA8/3NE/3NC/3NW), current rating, size/format, voltage, class. The full article number on the end cap answers everything; a photo of it beats three paragraphs of description.
Cross-reference to Bussmann, Mersen (Ferraz Shawmut) and peers is class-and-dimensions work — same format (NH size or cylindrical dimensions), same class letters, equal-or-better breaking data, and for semiconductor duty an I²t at or below the protected device's rating. The table below gives the method, not blind pairs.

1. The families

Family | Construction | Class range | Typical duty | Catalogue anchors |

3NA8 | NH blade links, sizes 000–3 | gG | Feeders, distribution boards, main circuits — shore and shipboard | Quoted by size and rating |

3NE (SITOR) | NH-style and bolt-connection semiconductor links | aR, gR, gS | VFD and soft-starter input, rectifiers, UPS input — e.g. 3NE4, 3NE3, 3NE6 710 A | See links |

3NC (SITOR cylindrical) | Cylindrical semiconductor links (10x38 up to 22x58 class) — e.g. 3NC5, 3NC1 10x38 | aR / gR | Small drives, control-power rectifiers, distributed power electronics | See links |

3NW | Cylindrical 10x38 links plus modular holders (1–3 pole, with/without indicator) and accessories | gG class links; holder system | Control circuits, small feeders, instrument and panel distribution | 3NW7 holder 32 A, 3NW7 auxiliary switch |

NH bases / strips | Bases, fuse rails, switch-disconnectors | — | The mounting half of every NH position | Quoted with the links |

NH size vocabulary, because every RFQ uses it: sizes run 000 (smallest) through 00, 1, 2, 3 — physical envelope and maximum rating grow with size, and a size-1 link does not fit a size-00 base. The size is as much a part of the order as the ampere rating; "160 A NH fuse" without a size is half a line.

2. Operating classes — what the letters promise

Class | Range | Protects | Must be paired with | Classic misuse |

gG | Full-range | Cables, feeders, general equipment — overload and short circuit | Nothing — self-sufficient for its duty | Ahead of a VFD as the only protection: too slow for the semiconductors |

aM | Partial-range (back-up) | Motor circuits against short circuit | An overload relay — see the starter finder and type-2 coordination practice | Standing alone — it deliberately ignores overloads |

aR | Partial-range, ultra-fast | Semiconductors against short circuit | Overload protection elsewhere (the drive's own electronics, a breaker) | In a feeder position; or sized by amps alone without the I²t check |

gR | Full-range, fast | Semiconductors, overload and short circuit | — | Assuming any gR equals any other — I²t and voltage still decide |

gS | Full-range | Semiconductor short-circuit duty plus cable overload in one link | — | Rare enough that stores confuse it with gG by looks — read the end cap |

Behind the letters stand the numbers that actually do the protecting: rated voltage (an AC-690 V link is not an AC-500 V link), breaking capacity, and for semiconductor classes the clearing I²t, which must sit below the protected device's withstand. Drive makers do this arithmetic and print the result as approved fuse lists — the correct engineering shortcut is to use them.

3. Reading and reordering an existing link

Step | What you read | Why it matters |

1. Family and article number on the end cap or label | e.g. 3NA8, 3NE, 3NC, 3NW + the full type code | The article number alone reorders the link exactly — everything else is verification |

2. Current rating and NH size / cylinder dimensions | e.g. 160 A size 1; 32 A 10x38 | Fit and rating; a longer cylindrical format will not enter the holder |

3. Voltage rating | 500 V / 690 V AC classes | Shipboard 690 V systems need 690 V links — a 500 V link there is a failure in waiting |

4. Operating class letters | gG / aM / aR / gR / gS | The duty contract — never downgraded in a substitution |

5. Blown-fuse indicator and striker | Indicator present/absent; striker for trip-coupled bases | Monitored positions (and holders with auxiliary switches) need like-for-like |

Panel-side notes that save return freight: cylindrical holders are poles-by-rating articles (1P and multi-pole 3NW7 variants carry different numbers), indicator versions differ from plain ones, and auxiliary-switch modules clip to specific holder generations. For NH positions state base or switch-disconnector type too — links and bases are quoted as a system.

4. Cross-reference method — Siemens to Bussmann, Mersen and peers

Keep identical | Check numerically | Acceptable to vary |

Format (NH size; cylinder dimensions), connection style | Rated current and voltage (equal or better voltage) | Brand, indicator style (if unmonitored) |

Operating class (gG→gG, aR→aR/gR with maker blessing) | Breaking capacity; for semiconductor duty clearing I²t ≤ device withstand | Country of manufacture |

Striker/indicator function where the base monitors it | Power dissipation in enclosed fuse rails | — |

For gG distribution links, Bussmann and Mersen NH equivalents of matching size, rating, voltage and class interchange as commodity items. For SITOR-class semiconductor positions the honest path is narrower: use the drive or rectifier maker's approved list, or match class, voltage, current and I²t line by line. We state the basis ("per approved list of drive type X" or "parameter-matched: class/V/A/I²t") on every substitution quote — the same honesty rule as our adhesive cross-reference applies to electrons.

5. Where these fuses live on a ship or plant

Distribution boards and MCC incomers carry 3NA8-class gG links where the design is fused rather than breaker-based — coordinated with downstream protection per the selectivity logic in our breaker coordination guide. Drive line-ups put SITOR (3NE/3NC) ahead of VFD and soft-starter inputs — the companion topic to VFD cabling practice — and motor feeders in fused designs pair aM links with overload relays in type-2 coordinated starters. Control and instrument distribution runs on the 10x38 3NW system, whose holders give panel builders per-circuit isolation, indication and auxiliary-contact signalling in one DIN-rail article. Spares policy worth stealing: one spare set of every link rating on board or in the plant store, because a blown semiconductor fuse at sea with no spare converts a cheap component into days of downtime.

How buying works at cballast. We quote the Siemens programme and parameter-matched Bussmann/Mersen alternatives side by side, with class, voltage and I²t stated per line on semiconductor positions, holders and bases on the same quotation. Accounts are vetted at onboarding; first order prepaid; established accounts on credit terms with repeat discounts; public bodies and utilities invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

What is a Siemens SITOR fuse?SITOR is Siemens' semiconductor-protection fuse programme — the 3NE (blade/bolt) and 3NC (cylindrical) families in classes aR, gR and gS. They clear short circuits fast enough to save diodes, thyristors and IGBTs in drives, soft starters, rectifiers and UPS inputs, which ordinary gG fuses and breakers cannot.
What is the difference between gG and aM fuses?gG is full-range: it protects against both overload and short circuit and can stand alone on cables and feeders. aM is motor-circuit back-up: it handles short circuits only and deliberately rides through overloads, so it must always be paired with an overload relay in the starter.
What do aR, gR and gS mean on a fuse?Semiconductor classes: aR is partial-range ultra-fast (short-circuit protection only), gR is full-range fast (overload plus short circuit), and gS adds cable-grade overload protection to semiconductor short-circuit speed. For a given drive, the maker's approved fuse list names which class and exact types apply.
Can I replace a SITOR fuse with a normal NH fuse of the same amps?No. A gG link of the same rating is orders of magnitude slower in the first milliseconds of a fault — the power semiconductors it was guarding will fail first. Replace semiconductor fuses class-for-class with matched I²t, ideally from the equipment maker's approved list.
What are NH fuse sizes 000, 00, 1, 2, 3?Standardised physical envelopes for LV HRC blade links — bigger size, bigger body and higher maximum ratings. Links and bases must match in size; the size is part of the article number and belongs on every RFQ line next to the ampere rating and voltage.
Is there a Bussmann or Mersen equivalent to Siemens fuses?For gG NH links, yes — match size, rating, voltage and class and the brands interchange. For SITOR semiconductor positions, equivalents exist but must be matched on voltage, current, class and clearing I²t against the protected device, or taken from the drive maker's list. We quote both routes and state the basis per line.
Who supplies Siemens 3NA, 3NE, 3NC and 3NW fuses?cballast.com quotes links, holders, bases and auxiliary modules across the families, with semiconductor positions parameter-checked rather than amp-matched. Send the article numbers or end-cap photos to sales@cballast.com.

References and related guides

Standards and sources referenced: IEC 60269 series (LV fuses; operating classes), Siemens SENTRON/SITOR catalogue data and configurators, drive manufacturers' approved-fuse lists; peer data from Bussmann and Mersen for cross-reference

method.

Circuit breaker coordination & selectivity

VFD motor cables — EMC, screening, length

Motor starter finder

IEC 60034 motor duty classes

Pilot light lamps — BA9s, XVLA cross-reference

Questions on a fuse substitution or a drive's approved list: write to sales@cballast.com. We answer whether or not you buy from us.

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