

Protection of other Loads and Consumers

- Branch circuit protection for “non-motor operated“ loads
- Determination of “full-load ampacity”
- Usable devices

Branch Circuit Protection for “Non-Motor Operated” Consumers

Dimensioning



Heating load

- Min. 125% of the rated current of the heating load
- Max. 60A rated current
- Dimensioning of wire cross-section acc. to the current of the branch circuit protection

General device protection

- Individual device NON-motor operated
 - a) According to the technical device documents
 - b) Max. 20A for devices whose rated current does not exceed 13.3A (if a) is not available)
 - c) Max. 150% for devices whose rated current exceeds 13.3A (if a) is not available)
- Individual device primarily motor operated load
 - According to the technical device documents
 - Or according to the dimensioning for motor branch circuits
 - Or according to the rules for receptacles

Exception: devices with flexible cord → protection provided via receptacle !

Determination of the “Full-Load Ampacity”

acc. to UL508A, Art.50.6

SIEMENS

Applicable to: transformers, heating loads and capacitors

Ratings:

- Transformers in [VA]
- Heating loads in [W]
- Capacitors in [VAR]

Formulas:

- Single-phase: Ampacity [A] = (power in VA, W or VAR) / (rated voltage [V])
- Three-phase: Ampacity [A] = (power in VA, W or VAR) / ($\sqrt{3} \times$ (rated voltage [V]))

Frequency Converters / Variable-Speed Drives / Soft Starting

Load devices with power semiconductors must be assessed separately

31.3.2 The branch circuit protection for a single-motor circuit provided with a variable-speed drive shall be of the type and size specified by the manufacturer's instructions provided with the drive. When the instructions do not specify the type and size, a branch-circuit fuse or inverse-time circuit breaker shall be used and shall be sized in accordance with 31.3.1(a) based upon the full-load motor output current rating of the drive.



This means:

- Branch circuit protection ONLY according to data in the UL Report
- Branch circuit protection may be omitted if integrated (UL Report)

Sizing of *branch-circuit protection* of a *variable speed drive* if not specified by the manufacturer instruction



Up to now

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As of now

31.3.2 The branch circuit protection for a single-motor circuit provided with a variable-speed drive shall be of the type and size specified by the manufacturer's instructions provided with the drive. When the instructions do not specify the type and size, a branch-circuit fuse or inverse-time circuit breaker shall be used and shall be sized in accordance with 31.3.1(a) based upon the full-load motor output current rating of the drive.

Example – Excerpt from SINAMIC G120/130/150 – UL Report

File E192450 Vol. 2 Sec. 4 Page 1 Issued: 2004-05-14
and Report

DESCRIPTION

PRODUCT COVERED:

CNL, USL - Open Type, Power Conversion Equipment,
Series SINAMICS S 120 Frame Size H, Cat. No. 6SL3 310-1TE36-1AAy,
6SL3 310-1TE37-5AAy and 6SL3 310-1TE38-4AAy,
Series SINAMICS G 130 Frame Size H, Cat. No. 6SL3 310-1GE36-1AAy,
6SL3 310-1GE37-5AAy and 6SL3 310-1GE38-4AAy,
Series SINAMICS G 150 Frame Size H, Cat. No. 6SL3 310-1TE36-1ABy,

MARKINGS:

1. Company name, electrical ratings and catalog number.
2. Suitable for use on a circuit capable of delivering not more than (a) kA rms symmetrical amperes, 480 Vac maximum when protected by R/C(JFHR2) semiconductor fuses as referred in the instruction manual(\$).

(a) 65 kA for devices rated 299 kW to 447 kW
84 kA for devices rated 448 kW to 671 kW

Note:

- A semiconductor fuse according to UL248-13 does **NOT** represent a suitable branch circuit protective device (unless specified in the UL Report)
- A semiconductor fuse can be **ADDITIONALLY** installed at any time



3NE1 813 SIEMENS SITOR
Fuse
Semiconductor LV HRC
design
UL recognized only!

Questions?



Note / Disclaimer

The circuit examples and interpretations of the standard are non-binding and do not claim completeness concerning configuration, equipping and contingencies. They do not represent customized solutions but merely provide support for typical tasks.

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The final decision as to whether an application complies with the corresponding American standards and regulations lies with the end customer or any organization respectively authorized by him (e.g. authority having jurisdiction, AHJ).