



Technical Info | Technic Note

# Branch Circuit Protection

for KEB drive controllers

|          |                                    |
|----------|------------------------------------|
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# 1 Preface

The Technic Notes contain additional information about the units and accessories. They are helping constructors and developers to use KEB products in their applications. However, they are considered for information only without responsibility. The selection with regard to their suitability for the intended use can only be made by the user. If you have any questions, please contact KEB Automation KG or your area representative.

**The use of our devices in the target products is beyond of our control and therefore exclusively the responsibility of the machine manufacturer, system integrator or customer.**

This document is not legally part of the certified device documentation. The functions described in the current KEB documentation must always be given priority. The enclosed documents correspond to conditions valid at printing. Misprint, mistakes and technical changes reserved.

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## 2 Structure of the document

This document is intended to assist in the selection of suitable protective devices for KEB drive controllers and EMC filters. We recommend the following procedure:

- Selecting the area of validity (IEC, UL/CSA)  
Note! Fuses intended for IEC applications, including those with UL approval, are not permitted for use in UL/CSA applications unless they are listed for such use.
- Selection of the equipment series (F6, S6, E6, etc.).
- Selection of power supply AC or DC.
- Selection of voltage class (depending on the device series).  
The rated voltage of the protective device must be at least equal to the rated voltage of the supply circuit.
- Selecting the type of protection (depending on the device series).  
You can choose from fuses, circuit breakers and motor protection switches (for motor circuits).

The table thus created lists the protective devices from various manufacturers that we tested according to their maximum rated current. Protective devices of the same series with a lower rated current are permissible if they are suitable for the application.

The table also shows the SCCR value that our drive controllers achieve in conjunction with the fuse used. The SCCR value must be higher than or equal to the maximum possible short-circuit current at the installation site.

KEB drive controllers have integrated motor overload protection. The settings for this can be found in the respective device documentation. The output of the KEB drive controller is conditionally protected against short circuits.

### 3 Scope of application IEC

The protective devices described in this section are intended for use in accordance with the IEC 60364 series of standards (HD 60364, VDE 0100). Any other local or national standards and regulations must be checked to ensure they are applicable.

#### 3.1 COMBILINE

##### 3.1.1 COMBILINE E4

###### 3.1.1.1 AC power supply

###### 3.1.1.1.1 400V class

###### 3.1.1.1.1.1 Type gG fuse

| Filter       | For inverter power up to | Maximum fuse | SCCR   |
|--------------|--------------------------|--------------|--------|
| 16E4T60-10xx | 15 kW                    | 50 A         | 30 kA  |
| 19E4T60-10xx | 30 kW                    | 80 A         | 30 kA  |
| 22E4T60-1xxx | 55 kW                    | 160 A        | 30 kA  |
| 25E4T60-xxxx | 110 kW                   | 250 A        | 30 kA  |
| 26E4T60-10xx | 132 kW                   | 315 A        | 100 kA |
| 28E4T60-10xx | 200 kW                   | 500 A        | 100 kA |
| 28E4T60-1002 | 200 kW                   | 500 A        | 100 kA |
| 30E4T60-10xx | 315 kW                   | 630 A        | 100 kA |

Tab. 1: 400 V-class protection with a fuse in accordance with IEC

###### 3.1.1.1.1.2 Semiconductor fuses

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note                 |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|----------------------|
| 26E4T60-1001 | 132 kW                   | SIBA         | 20 610 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 611 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 612 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 613 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 614 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 615 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 616 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 618 32.315            | 315 A     | 100 kA | UL                   |
|              |                          |              | 20 623 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 624 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 625 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 628 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 660 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 661 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 664 32.315            | 315 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 671 32.315            | 315 A     | 100 kA | UL                   |
|              |                          | Bussmann     | 170M4141                 | 315 A     | 100 kA | UL                   |
|              |                          |              | 170M4171                 | 315 A     | 100 kA | UL                   |
|              |                          |              | 170M4191                 | 315 A     | 100 kA |                      |

[illegible]

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note                 |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|----------------------|
|              |                          | Bussmann     | 170M3521                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3471                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3621                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3271                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3121                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3721                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3371                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3671                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3771                 | 500 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 170M3291                 | 500 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 170M3221                 | 500 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 170M3021                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3571                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3321                 | 500 A     | 100 kA | UL                   |
|              |                          | Littelfuse   | L70QS500                 | 500 A     | 100 kA | UL                   |
|              |                          |              |                          |           |        | UL                   |
| 30E4T60-1001 | 315 kW                   | SIBA         | 20 610 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 611 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 612 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 613 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 614 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 615 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 616 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 618 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 620 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 621 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 622 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 623 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 624 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 625 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 626 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 628 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 630 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 631 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 632 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 633 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 634 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 635 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 636 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 638 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 660 32.630            | 630 A     | 100 kA | UL                   |

| Filter | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note    |
|--------|--------------------------|--------------|--------------------------|-----------|--------|---------|
|        |                          | Bussmann     | 20 661 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 664 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 666 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 670 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 671 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 674 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 680 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 681 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 20 684 32.630            | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3023                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3123                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3273                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3293                 | 630 A     | 100 kA | Kein UL |
|        |                          |              | 170M3473                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3573                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3623                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3673                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3723                 | 630 A     | 100 kA | UL      |
|        |                          |              | 170M3773                 | 630 A     | 100 kA | UL      |
|        |                          | Littelfuse   | L70QS600                 | 600 A     | 100 kA | UL      |

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 2: Protection according to IEC 400V class

### 3.1.1.2 DC power supply

#### 3.1.1.2.1 400V class

##### 3.1.1.2.1.1 Semiconductor fuses

#### Protection of DC filters

This section describes the fuses required for the operation of the DC filters. For each filter, a recommended fuse and several alternative fuses are specified.

The recommended fuse is designed for continuous operation (S1 operation) at 100 % load and maximum ambient temperature. If operating conditions differ, the fuse rating must be adjusted accordingly (see the manufacturer's documentation for the relevant fuse).

As an alternative to the recommended fuses, any of the fuses listed in the table below may be used. Fuses of the same type with a lower rated current or other specifications (e.g. connection type, signalling contact, etc.) may also be used, provided they are suitable for the application. The deviating characteristics must not have any adverse effect on the transmission values ( $I^2t$  and  $I_p$ ).

**NOTICE****Observe the rated voltage of the fuse!**

a) The rated voltage of the fuse must be at least equal to the maximum DC supply voltage of the drive controller.

| Filter                       | Manufacturer | Type          | SCCR  | Note        |
|------------------------------|--------------|---------------|-------|-------------|
| 12E6T60-7B00                 | SIBA         | 50 215 06.16  | 30 kA | recommended |
|                              |              | 50 215 06.20  | 30 kA |             |
|                              |              | 50 204 34.25  | 30 kA |             |
|                              |              | 50 118 06.30  | 30 kA |             |
|                              |              | 50 120 06.32  | 30 kA |             |
|                              |              | 50 250 06.50  | 30 kA |             |
|                              |              | 20 209 37.50  | 30 kA |             |
|                              |              | 50 268 06.50  | 30 kA |             |
|                              |              | 50 201 06.63  | 30 kA |             |
|                              | Bussmann     | FWP-50A14F    | 30 kA |             |
|                              | Littelfuse   | 170M1414      | 30 kA |             |
|                              |              | L70QS050      | 30 kA |             |
| 16E6T60-7B00                 | SIBA         | 50 215 06.20  | 30 kA | recommended |
|                              |              | 50 204 34.25  | 30 kA |             |
|                              |              | 50 118 06.30  | 30 kA |             |
|                              |              | 50 120 06.32  | 30 kA |             |
|                              |              | 50 201 06.63  | 30 kA |             |
|                              |              | 50 250 06.63  | 50 kA |             |
|                              |              | 50 250 06.80  | 50 kA |             |
|                              |              | 20 209 37.100 | 50 kA |             |
|                              |              | 50 268 06.100 | 30 kA |             |
|                              | Bussmann     | FWP-50A14F    | 30 kA |             |
|                              | Littelfuse   | 170M1417      | 30 kA |             |
|                              |              | L70QS150      | 30 kA |             |
| 18E6T60-7B00<br>18E6T60-7210 | Bussmann     | 50 201 06.63  | 30 kA | recommended |
|                              |              | 50 250 06.80  | 50 kA |             |
|                              |              | 50 280 06.100 | 50 kA |             |
|                              |              | 20 209 37.100 | 50 kA |             |
|                              |              | 50 268 06.125 | 50 kA |             |
|                              |              | 20 031 34.125 | 50 kA |             |
|                              |              | 20 556 34.160 | 30 kA |             |
|                              |              | FWP-50A14F    | 30 kA |             |
|                              |              | FWP-100A22F   | 50 kA |             |
|                              |              | 170M1420      | 50 kA |             |
|                              | Littelfuse   | L70QS400      | 50 kA |             |
|                              |              |               |       |             |
| 20E6T60-7B00                 | SIBA         | 50 201 06.63  | 30 kA |             |
|                              |              | 50 250 06.80  | 50 kA |             |
|                              |              | 50 280 06.100 | 50 kA |             |

| Filter       | Manufacturer | Type                                                                                                                                                                       | SCCR                                                                                            | Note                                    |
|--------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------|
|              | Bussmann     | 20 209 37.100<br>50 268 06.125<br>20 556 34.160<br>20 557 34.160<br>FWP-100A22F<br>170M1419<br>170M1420                                                                    | 50 kA<br>50 kA<br>30 kA<br>50 kA<br>50 kA<br>50 kA<br>50 kA                                     | not UL-ap-<br>proved<br><br>recommended |
|              | Littelfuse   | L70QS4000                                                                                                                                                                  | 50 kA                                                                                           |                                         |
| 24E6T60-7B00 | SIBA         | 50 250 06.80<br>50 280 06.100<br>20 209 37.100<br>50 268 06.125<br>20 556 34.160<br>20 557 34.250<br>20 568 34.315<br>20 031 34.315<br>FWP-100A22F<br>170M1422<br>170M4245 | 50 kA<br>50 kA<br>50 kA<br>50 kA<br>30 kA<br>50 kA<br>50 kA<br>50 kA<br>50 kA<br>50 kA<br>50 kA | recommended                             |
|              | Littelfuse   | L70QS500                                                                                                                                                                   | 50 kA                                                                                           |                                         |
| 28E5T60-7A00 | SIBA         | 20 557 34.250<br>20 031 34.315<br>20 568 34.400                                                                                                                            | 50 kA<br>50 kA<br>85 kA                                                                         |                                         |
|              | Bussmann     | 170M1422<br>170M4245<br>170M4246<br>170M6197                                                                                                                               | 50 kA<br>85 kA<br>85 kA<br>85 kA                                                                | recommended                             |
|              | Littelfuse   | L70QS500<br>PSR073DL0700<br>PSX3XLDB0900                                                                                                                                   | 50 kA<br>85 kA<br>85 kA                                                                         |                                         |
| 30E5T60-7A00 | SIBA         | 20 568 34.400                                                                                                                                                              | 85 kA                                                                                           |                                         |
|              | Bussmann     | 170M4246<br>170M6150<br>170M6196                                                                                                                                           | 85 kA<br>85 kA<br>85 kA                                                                         | recommended                             |
|              | Littelfuse   | L70QS500<br>PSR073DL0700<br>PSX3XLDB1400                                                                                                                                   | 50 kA<br>85 kA<br>85 kA                                                                         |                                         |
| 33E6T60-7A00 | Bussmann     | 170M6150<br>170M6199                                                                                                                                                       | 85 kA<br>85 kA                                                                                  | recommended                             |
|              | Littelfuse   | PSR073DL0700<br>PSX3XLDB1400                                                                                                                                               | 85 kA<br>85 kA                                                                                  |                                         |

Tab. 3: Protection according to IEC 400V class

## 3.1.2 COMBILINE E6

## 3.1.2.1 AC power supply

## 3.1.2.1.1 230V class

## 3.1.2.1.2 400V class

## 3.1.2.1.2.1 Type gG fuse

| Filter       | For inverter power up to | Maximum fuse | SCCR   |
|--------------|--------------------------|--------------|--------|
| 12E6T60-30xx | 4.0 kW                   | 20 A         | 30 kA  |
| 14E6T60-1050 | 4.0 kW                   | 25 A         | 30 kA  |
| 14E6T60-30xx | 7.5 kW                   | 25 A         | 30 kA  |
| 14E6T60-4100 | 7.5 kW                   |              |        |
| 16E6T60-1050 | 15 kW                    | 50 A         | 30 kA  |
| 16E6T60-30xx | 15 kW                    | 50 A         | 30 kA  |
| 16E6T60-4100 | 15 kW                    |              |        |
| 17E6T60-4100 | 18.5 kW                  |              |        |
| 18E6T60-1050 | 22 kW                    | 80 A         | 30 kA  |
| 18E6T60-30xx | 22 kW                    | 80 A         | 30 kA  |
| 18E6T60-4100 | 22 kW                    |              |        |
| 19E6T60-4100 | 30 kW                    |              |        |
| 20E6T60-1050 | 37 kW                    | 100 A        | 30 kA  |
| 20E6T60-3xxx | 37 kW                    | 100 A        | 30 kA  |
| 20E6T60-4100 | 37 kW                    |              |        |
| 21E6T60-4100 | 45 kW                    |              |        |
| 22E6T60-1050 | 55 kW                    | 160 A        | 30 kA  |
| 22E6T60-3xxx | 55 kW                    | 160 A        | 30 kA  |
| 22E6T60-4100 | 55 kW                    |              |        |
| 22E6T60-5150 | 55 kW                    | 160 A        | 30 kA  |
| 23E6T60-5150 | 75 kW                    | 200 A        | 30 kA  |
| 24E6T60-3xxx | 90 kW                    | 250 A        | 30 kA  |
| 24E6T60-5150 | 90 kW                    | 250 A        | 30 kA  |
| 27E6T60-1150 | 160 kW                   | 355 A        | 30 kA  |
| 27E6T60-30xx | 160 kW                   | 355 A        | 100 kA |
| 28E6T60-1150 | 200 kW                   | 400 A        | 30 kA  |
| 30E6T60-1150 | 315 kW                   | 630 A        | 100 kA |
| 33E6T60-31xx | 450 kW                   | 2 × 450 A    | 100 kA |

Tab. 4: 400 V-class protection with a fuse in accordance with IEC

## 3.1.2.1.2.2 Semiconductor fuses

| Filter | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR  | Note |
|--------|--------------------------|--------------|--------------------------|-----------|-------|------|
| 12     | 4.0 kW                   | SIBA         | 50 118 06.25             | 25 A      | 30 kA | UL   |
|        |                          |              | 50 120 06.25             | 25 A      | 30 kA | UL   |
|        |                          |              | 50 201 06.25             | 25 A      | 30 kA | UL   |
|        |                          |              | 50 204 34.25             | 25 A      | 30 kA | UL   |
|        |                          |              | 50 250 06.25             | 25 A      | 30 kA | UL   |

[illegible]

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note                 |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|----------------------|
|              |                          | Littelfuse   | PSR030DL0350             | 350 A     | 100 kA | UL                   |
|              |                          |              | PSR030DS0350             | 350 A     | 100 kA | UL                   |
|              |                          |              | PSR030FL0350             | 350 A     | 100 kA | UL                   |
|              |                          |              | PSR030FS0350             | 350 A     | 100 kA | UL                   |
|              |                          |              | PSR030UL0350             | 350 A     | 100 kA | UL                   |
|              |                          |              | PSR030US0350             | 350 A     | 100 kA | UL                   |
| 28E6T60-1150 | 200 kW                   | SIBA         | 20 620 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 621 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 622 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 623 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 624 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 625 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 626 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 628 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 630 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 631 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 632 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 633 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 634 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 635 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 636 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 638 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 660 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 661 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 664 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 670 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 671 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 674 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 680 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 681 32.500            | 500 A     | 100 kA | UL                   |
|              |                          |              | 20 684 32.500            | 500 A     | 100 kA | UL                   |
|              |                          | Bussmann     | 170M3521                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3471                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3621                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3271                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3121                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3721                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3371                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3671                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3771                 | 500 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 170M3291                 | 500 A     | 100 kA |                      |

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note                 |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|----------------------|
|              |                          | Littelfuse   | 170M3221                 | 500 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 170M3021                 | 500 A     | 100 kA |                      |
|              |                          |              | 170M3571                 | 500 A     | 100 kA | UL                   |
|              |                          |              | 170M3321                 | 500 A     | 100 kA | UL                   |
|              |                          |              | L70QS500                 | 500 A     | 100 kA | UL                   |
|              |                          |              |                          |           |        | UL                   |
| 30E6T60-1150 | 315 kW                   | SIBA         | 20 610 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 611 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 612 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 613 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 614 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 615 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 616 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 618 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 620 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 621 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 622 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 623 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 624 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 625 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 626 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 628 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 630 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 631 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 632 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 633 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 634 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 635 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 636 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 638 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 660 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 661 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 664 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 666 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 670 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 671 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 674 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 680 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 681 32.630            | 630 A     | 100 kA | UL                   |
|              |                          |              | 20 684 32.630            | 630 A     | 100 kA | UL                   |
|              |                          | Bussmann     | 170M3023                 | 630 A     | 100 kA | UL                   |

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note                 |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|----------------------|
|              |                          |              | 170M3123                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3273                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3293                 | 630 A     | 100 kA | Kein UL              |
|              |                          |              | 170M3473                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3573                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3623                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3673                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3723                 | 630 A     | 100 kA | UL                   |
|              |                          |              | 170M3773                 | 630 A     | 100 kA | UL                   |
|              |                          | Littelfuse   | L70QS600                 | 600 A     | 100 kA | UL                   |
| 33E6T60-3150 | 450 kW                   | SIBA         | 20 610 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 612 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 613 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 614 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 615 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 616 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 618 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 620 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 621 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 622 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 623 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 624 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 625 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 626 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 628 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 630 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 631 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 632 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 633 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 634 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 635 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 636 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 638 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 660 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 661 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 664 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 670 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 671 32.900            | 900 A     | 100 kA | UL                   |
|              |                          |              | 20 674 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 680 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |
|              |                          |              | 20 681 32.900            | 900 A     | 100 kA | not UL-ap-<br>proved |

[illegible]

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 5: Protection according to IEC 400V class

### 3.1.2.2 DC power supply

#### 3.1.2.2.1 400V class

#### 3.1.2.2.1.1 Semiconductor fuses

## Protection of DC filters

This section describes the fuses required for the operation of the DC filters. For each filter, a recommended fuse and several alternative fuses are specified.

The recommended fuse is designed for continuous operation (S1 operation) at 100 % load and maximum ambient temperature. If operating conditions differ, the fuse rating must be adjusted accordingly (see the manufacturer's documentation for the relevant fuse).

As an alternative to the recommended fuses, any of the fuses listed in the table below may be used. Fuses of the same type with a lower rated current or other specifications (e.g. connection type, signalling contact, etc.) may also be used, provided they are suitable for the application. The deviating characteristics must not have any adverse effect on the transmission values ( $I^2t$  and  $I_p$ ).

**NOTICE**

**Observe the rated voltage of the fuse!**

- a) The rated voltage of the fuse must be at least equal to the maximum DC supply voltage of the drive controller.

| Filter                       | Manufacturer | Type          | SCCR  | Note        |
|------------------------------|--------------|---------------|-------|-------------|
| 12E6T60-7B00                 | SIBA         | 50 215 06.16  | 30 kA | recommended |
|                              |              | 50 215 06.20  | 30 kA |             |
|                              |              | 50 204 34.25  | 30 kA |             |
|                              |              | 50 118 06.30  | 30 kA |             |
|                              |              | 50 120 06.32  | 30 kA |             |
|                              |              | 50 250 06.50  | 30 kA |             |
|                              |              | 20 209 37.50  | 30 kA |             |
|                              |              | 50 268 06.50  | 30 kA |             |
|                              |              | 50 201 06.63  | 30 kA |             |
|                              | Bussmann     | FWP-50A14F    | 30 kA |             |
| Littelfuse                   | 170M1414     | 30 kA         |       |             |
|                              | L70QS050     | 30 kA         |       |             |
| 16E6T60-7B00                 | SIBA         | 50 215 06.20  | 30 kA | recommended |
|                              |              | 50 204 34.25  | 30 kA |             |
|                              |              | 50 118 06.30  | 30 kA |             |
|                              |              | 50 120 06.32  | 30 kA |             |
|                              |              | 50 201 06.63  | 30 kA |             |
|                              |              | 50 250 06.63  | 50 kA |             |
|                              |              | 50 250 06.80  | 50 kA |             |
|                              |              | 20 209 37.100 | 50 kA |             |
|                              |              | 50 268 06.100 | 30 kA |             |
|                              | Bussmann     | FWP-50A14F    | 30 kA |             |
| Littelfuse                   | 170M1417     | 30 kA         |       |             |
|                              | L70QS150     | 30 kA         |       |             |
| 18E6T60-7B00<br>18E6T60-7210 | Bussmann     | 50 201 06.63  | 30 kA | recommended |
| Littelfuse                   |              | 50 250 06.80  | 50 kA |             |
|                              |              | 50 280 06.100 | 50 kA |             |
|                              |              | 20 209 37.100 | 50 kA |             |
|                              |              | 50 268 06.125 | 50 kA |             |
|                              |              | 20 031 34.125 | 50 kA |             |
|                              |              | 20 556 34.160 | 30 kA |             |
|                              |              | FWP-50A14F    | 30 kA |             |
|                              |              | FWP-100A22F   | 50 kA |             |
|                              | 170M1420     | 50 kA         |       |             |
| Littelfuse                   | L70QS400     | 50 kA         |       |             |
| 20E6T60-7B00                 | SIBA         | 50 201 06.63  | 30 kA |             |
|                              |              | 50 250 06.80  | 50 kA |             |
|                              |              | 50 280 06.100 | 50 kA |             |
|                              |              | 20 209 37.100 | 50 kA |             |
|                              |              | 50 268 06.125 | 50 kA |             |
|                              |              | 20 556 34.160 | 30 kA |             |
|                              |              | 20 557 34.160 | 50 kA |             |

| Filter       | Manufacturer | Type          | SCCR  | Note                 |
|--------------|--------------|---------------|-------|----------------------|
|              | Bussmann     | FWP-100A22F   | 50 kA | not UL-ap-<br>proved |
|              |              | 170M1419      | 50 kA |                      |
|              |              | 170M1420      | 50 kA |                      |
|              | Littelfuse   | L70QS4000     | 50 kA | recommended          |
| 24E6T60-7B00 | SIBA         | 50 250 06.80  | 50 kA |                      |
|              |              | 50 280 06.100 | 50 kA |                      |
|              |              | 20 209 37.100 | 50 kA |                      |
|              |              | 50 268 06.125 | 50 kA |                      |
|              |              | 20 556 34.160 | 30 kA |                      |
|              |              | 20 557 34.250 | 50 kA |                      |
|              |              | 20 568 34.315 | 50 kA |                      |
|              |              | 20 031 34.315 | 50 kA |                      |
|              | Bussmann     | FWP-100A22F   | 50 kA |                      |
|              |              | 170M1422      | 50 kA |                      |
|              |              | 170M4245      | 50 kA |                      |
|              | Littelfuse   | L70QS500      | 50 kA |                      |
| 28E5T60-7A00 | SIBA         | 20 557 34.250 | 50 kA |                      |
|              |              | 20 031 34.315 | 50 kA |                      |
|              |              | 20 568 34.400 | 85 kA |                      |
|              | Bussmann     | 170M1422      | 50 kA |                      |
|              |              | 170M4245      | 85 kA |                      |
|              |              | 170M4246      | 85 kA |                      |
|              |              | 170M6197      | 85 kA |                      |
|              | Littelfuse   | L70QS500      | 50 kA |                      |
|              |              | PSR073DL0700  | 85 kA |                      |
|              |              | PSX3XLDB0900  | 85 kA |                      |
| 30E5T60-7A00 | SIBA         | 20 568 34.400 | 85 kA |                      |
|              | Bussmann     | 170M4246      | 85 kA |                      |
|              |              | 170M6150      | 85 kA |                      |
|              |              | 170M6196      | 85 kA |                      |
|              | Littelfuse   | L70QS500      | 50 kA |                      |
|              |              | PSR073DL0700  | 85 kA |                      |
|              |              | PSX3XLDB1400  | 85 kA |                      |
| 33E6T60-7A00 | Bussmann     | 170M6150      | 85 kA |                      |
|              |              | 170M6199      | 85 kA |                      |
|              | Littelfuse   | PSR073DL0700  | 85 kA |                      |
|              |              | PSX3XLDB1400  | 85 kA |                      |

Tab. 6: Protection according to IEC 400V class

## 3.2 COMBIVERT

### 3.2.1 COMBIVERT F6

#### 3.2.1.1 AC power supply

##### 3.2.1.1.1 230V class

##### 3.2.1.1.1.1 Type gG fuse

| Housing | Drive controller | Device power | Maximum fuse | SCCR  |
|---------|------------------|--------------|--------------|-------|
| 2       | 10F6xx2-xxxx     | 2.2 kW       | 20 A         | 30 kA |
| 2       | 12F6xx2-xxxx     | 4.0 kW       | 32 A         | 30 kA |
| 2       | 13F6xx2-xxxx     | 5.5 kW       | 35 A         | 30 kA |
| 2       | 14F6xx2-xxxx     | 7.5 kW       | 50 A         | 30 kA |
| 3       | 15F6xx3-xxxx     | 11 kW        | 80 A         | 30 kA |
| 3       | 16F6xx3-xxxx     | 15 kW        | 80 A         | 30 kA |
| 3       | 17F6xx3-xxxx     | 18.5 kW      | 100 A        | 30 kA |
| 4       | 18F6xx4-xxxx     | 22 kW        | 125 A        | 30 kA |
| 6       | 18F6xx6-xxxx     | 22 kW        | 125 A        | 30 kA |
| 6       | 19F6xx4-xxxx     | 30 kW        | 160 A        | 30 kA |

Tab. 7: 230 V-class protection with fuses in accordance with IEC

##### 3.2.1.1.2 400V class

##### 3.2.1.1.2.1 Type gG fuse

| Housing | Drive controller | Device performance | Maximum fuse | SCCR   |
|---------|------------------|--------------------|--------------|--------|
| 2       | 12F6xx2-xxxx     | 4.0 kW             | 20 A         | 30 kA  |
| 2       | 13F6xx2-xxxx     | 5.5 kW             | 25 A         | 30 kA  |
| 2       | 14F6xx2-xxxx     | 7.5 kW             | 25 A         | 30 kA  |
| 2       | 15F6xx2-xxxx     | 11 kW              | 35 A         | 30 kA  |
| 2       | 16F6xx2-xxxx     | 15 kW              | 50 A         | 30 kA  |
| 3       | 17F6xx3-xxxx     | 18.5 kW            | 63 A         | 30 kA  |
| 3       | 18F6xx3-xxxx     | 22 kW              | 80 A         | 30 kA  |
| 3       | 19F6xx3-xxxx     | 30 kW              | 80 A         | 30 kA  |
| 3       | 20F6xx3-xxxx     | 37 kW              | 100 A        | 30 kA  |
| 4       | 18F6xx4-xxxx     | 22 kW              | 80 A         | 30 kA  |
| 4       | 19F6xx4-xxxx     | 30 kW              | 80 A         | 30 kA  |
| 4       | 20F6xx4-xxxx     | 37 kW              | 100 A        | 30 kA  |
| 4       | 21F6xx4-xxxx     | 45 kW              | 125 A        | 30 kA  |
| 4       | 22F6xx4-xxxx     | 55 kW              | 160 A        | 30 kA  |
| 6       | 21F6xx6-xxxx     | 45 kW              | 125 A        | 30 kA  |
| 6       | 22F6xx6-xxxx     | 55 kW              | 160 A        | 30 kA  |
| 6       | 23F6xx6-xxxx     | 75 kW              | 200 A        | 30 kA  |
| 6       | 24F6xx6-xxxx     | 90 kW              | 250 A        | 30 kA  |
| 7       | 25F6xx7-xxxx     | 110 kW             | 250 A        | 30 kA  |
| 7       | 26F6xx7-xxxx     | 132 kW             | 315 A        | 30 kA  |
| 7       | 27F6xx7-xxxx     | 160 kW             | 355 A        | 30 kA  |
| 7       | 28F6xx7-xxxx     | 200 kW             | 400 A        | 30 kA  |
| 8       | 27F6xx8-xxxx     | 160 kW             | 500 A        | 100 kA |

| Housing | Drive controller | Device performance | Maximum fuse      | SCCR   |
|---------|------------------|--------------------|-------------------|--------|
| 8       | 28F6xx8-xxxx     | 200 kW             | 500 A             | 100 kA |
| 8       | 29F6xx8-xxxx     | 250 kW             | 630 A             | 100 kA |
| 8       | 30F6xx8-xxxx     | 315 kW             | 630 A             | 100 kA |
| 9       | 29F6xx9-xxxx     | 250 kW             | 630 A             | 100 kA |
| 9       | 30F6xx9-xxxx     | 315 kW             | 630 A             | 100 kA |
| 9       | 31F6xx9-xxxx     | 355 kW             | 700 A (2 × 350 A) | 100 kA |
| 9       | 32F6xx9-xxxx     | 400 kW             | 800 A (2 × 400 A) | 100 kA |
| 9       | 33F6xx9-xxxx     | 450 kW             | 900 A (2 × 450 A) | 100 kA |

Tab. 8: 400 V-class protection with a fuse in accordance with IEC

## 3.2.1.1.2.2 Semiconductor fuses

| Housing | Drive controller | Device performance | Manufacturer | Item number <sup>1</sup>                                                                                                     | recommended fuse | SCCR  |
|---------|------------------|--------------------|--------------|------------------------------------------------------------------------------------------------------------------------------|------------------|-------|
| 2       | 12F6xx2-xxxx     | 4.0 kW             | SIBA         | 50 118 06.xx<br>50 120 06.xx<br>50 201 06.xx<br>50 204 34.xx<br>50 215 06.xx<br>50 250 06.xx<br>50.268 06.xx<br>50 280 06.xx | 25 A             | 30 kA |
|         |                  |                    | Bussmann     | FWP-xxA14F<br>FWP-xxA22F<br>170M1361<br>170M1411                                                                             |                  |       |

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 9: 400 V-class protection using solid-state fuses in accordance with IEC

## 3.2.1.1.2.3 Protection using a motor protection switch

Below is a list of the recommended motor protection switches for protecting the drive inverter. The selection is based on continuous operation (S1 operation) at 100% capacity and the maximum ambient temperature.

If operating conditions differ, the rating of the motor protection switches must be adjusted (see the manufacturer's documentation for the relevant motor protection switches).

As an alternative to the recommended motor protection circuit breakers, motor protection circuit breakers of the same type with a lower rated current or different specifications (e.g. terminal blocks, operating mechanisms, etc.) may also be used, provided that they are suitable for the application and the differing specifications do not have a detrimental effect on the allowable values ( $I^2t$  and  $I_p$ ).

Motor protection circuit breakers of the same type with a lower breaking capacity may be used, provided they are suitable for the application. In this case, the short-circuit current rating (SCCR) of the combination of the drive converter and the motor protection switch is limited to the breaking capacity of the motor protection switch.

| Housing | Drive controller | Device power | Manufacturer | Type     | Rated current | SCCR  |
|---------|------------------|--------------|--------------|----------|---------------|-------|
| 2       | 12F6xx2-xxxx     | 7.5 kW       | Eaton        | PKZM0-16 | 20 A          | 30 kA |
| 2       | 13F6xx2-xxxx     | 9 kW         | Eaton        | PKZM0-20 | 20 A          | 18 kA |
| 2       | 14F6xx2-xxxx     | 12.5 kW      | Eaton        | PKZM0-25 | 25 A          | 18 kA |
| 2       | 15F6xx2-xxxx     | 15 kW        | Eaton        | PKZM0-32 | 32 A          | 18 kA |
| 2       | 16F6xx2-xxxx     | 25 kW        | Eaton        | PKZM4-50 | 50 A          | 30 kA |
| 2       | alternatively    | 7.5 kW       | Eaton        | PKZM0-16 | 16 A          | 30 kA |
| 2       | alternatively    | 15 kW        | Eaton        | PKZM0-32 | 32 A          | 18 kA |
| 2       | alternatively    | 25 kW        | Eaton        | PKZM4-50 | 50 A          | 30 kA |
| 3       | 17F6xx3-xxxx     | 18.5 kW      | Eaton        | PKZM4-58 | 50 A          | 30 kA |
| 3       | 18F6xx3-xxxx     | 22 kW        | Eaton        | PKZM4-63 | 65 A          | 30 kA |
| 3       | alternatively    | 34 kW        | Eaton        | PKZM4-63 | 63 A          | 30 kA |
| 4       | 18F6xx4-xxxx     | 34 kW        | Eaton        | PKZM4-63 | 63 A          | 30 kA |
| 4       | alternatively    | 34 kW        | Eaton        | PKZM4-50 | 66 A          | 30 kA |

Tab. 10: 400 V-class protection with a motor protection switch in accordance with IEC



Use of additional motor protection switches in the IEC standard

Motor protection circuit breakers not listed here may be used, provided they meet the following requirements at the rated voltage:

- Current-time integral  $I^2t < 910\text{kA}^2\text{s}$
- Break current  $I_p < 18\text{ kA}$

#### 3.2.1.1.2.4 Protection using circuit breakers

Below is a list of the recommended circuit breakers for protecting the drive inverter. The selection is based on continuous operation (S1 operation) at 100% capacity and the maximum ambient temperature.

If operating conditions differ, the circuit breakers must be sized accordingly (see the manufacturer's documentation for the relevant circuit breakers).

As an alternative to the recommended circuit breakers, circuit breakers of the same type with a lower rated current or different specifications (e.g. terminal blocks, operating mechanisms, etc.) may also be used, provided that they are suitable for the application and the differing specifications do not have a detrimental effect on the allowable values ( $I^2t$  and  $I_p$ ).

Circuit breakers of the same type with a lower breaking capacity may be used, provided they are suitable for the application. In this case, the short-circuit current rating (SCCR) of the combination of the drive converter and the circuit breaker is limited to the breaking capacity of the circuit breaker.

| Housing | Drive controller | Device power | Manufacturer | Type          | Rated current | SCCR  |
|---------|------------------|--------------|--------------|---------------|---------------|-------|
| 2       | alternatively    | 7.5 kW       | Siemens      | 3RV2010-4AA10 | 16 A          | 30 kA |
| 2       | alternatively    | 15 kW        | Siemens      | 3RV2021-4EA10 | 32 A          | 30 kA |
| 2       | alternatively    | 22 kW        | Siemens      | 3RV2032-4VA10 | 45 A          | 30 kA |
| 2       | alternatively    | 11 kW        | Schneider    | GV2P22        | 25 A          | 10 kA |
| 2       | alternatively    | 22 kW        | Schneider    | GV3P50        | 50 A          | 30 kA |
| 3       | 19F6xx3-xxxx     | 30 kW        | Siemens      | 3RV2032-4KA10 | 73 A          | 30 kA |
| 3       | 20F6xx3-xxxx     | 37 kW        | Siemens      | 3RV2042-4KA10 | 84 A          | 30 kA |
| 3       | alternatively    | 37 kW        | Siemens      | 3RV2032-4KA10 | 73 A          | 30 kA |

| Housing | Drive controller | Device power | Manufacturer | Type               | Rated current | SCCR  |
|---------|------------------|--------------|--------------|--------------------|---------------|-------|
| 3       | alternatively    | 45 kW        | Siemens      | 3RV2042-4YA10      | 93 A          | 30 kA |
| 3       | alternatively    | 30 kW        | Schneider    | GV3P65             | 65 A          | 30 kA |
| 3       | alternatively    | -            | Siemens      | 3VA5110-6ED31-0AA0 | 100 A         | 30 kA |
| 3       | alternatively    | -            | Schneider    | BJL36100           | 100 A         | 30 kA |
| 4       | 19F6xx4-xxxx     | -            | Eaton        | NZMN1-A80-NA       | 80 A          | 30 kA |
| 4       | 20F6xx4-xxxx     | -            | Eaton        | NZMN1-A100-NA      | 100 A         | 30 kA |
| 4       | 21F6xx4-xxxx     | -            | Eaton        | NZMN1-A100-NA      | 100 A         | 30 kA |
| 4       | 22F6xx4-xxxx     | -            | Eaton        | NZMN1-A125-NA      | 125 A         | 30 kA |
| 4       | alternatively    | 37 kW        | Siemens      | 3RV2032-4KA10      | 73 A          | 30 kA |
| 4       | alternatively    | 45 kW        | Siemens      | 3RV2042-4MA10      | 93 A          | 30 kA |
| 4       | alternatively    | 30 kW        | Schneider    | GV3P65             | 65 A          | 30 kA |
| 4       | alternatively    | -            | Eaton        | NZMN1-A125-NA      | 125 A         | 30 kA |
| 4       | alternatively    | -            | Eaton        | NZMN2-A160-NA      | 160 A         | 30 kA |
| 4       | alternatively    | -            | Siemens      | 3VA5112-6ED31-0AA0 | 125 A         | 30 kA |
| 4       | alternatively    | -            | Siemens      | 3VA5215-6ED31-0AA0 | 150 A         | 30 kA |
| 4       | alternatively    | -            | Schneider    | BJL36125           | 125 A         | 30 kA |

Tab. 11: 400 V-class protection with a circuit-breaker in accordance with IEC



Use of additional circuit breakers in the IEC standard

Circuit breakers not listed here may be used, provided they meet the following requirements at the rated voltage:

- Current-time integral  $I^2t < 910 \text{ kA}^2\text{s}$
- Break current  $I_p < 18 \text{ kA}$

### 3.2.1.2 DC power supply

#### 3.2.1.2.1 400V class

##### 3.2.1.2.1.1 Semiconductor fuses

#### Fusing of frequency inverters in DC link connection

**Semiconductor protection fuses** (fuses of type *aR* or *gR*) are generally used to protect frequency converters in DC link connections. These fuses are specially designed to protect power electronic components such as diodes, thyristors or IGBTs.

In a DC link connection, several frequency converters are operated at a common DC link voltage. This can result in energy flows between the individual drives (e.g. regeneration of braking energy into the drive of another motor). At the same time, operation requires reliable protection against faults such as short circuits or earth faults in the DC circuit.

#### Function of the fuses

- **Protection of semiconductor devices:** The switching transistors (IGBTs) in the frequency converter are very sensitive to high short-circuit currents. Standard line protection fuses or *gG* fuses are too slow to provide adequate protection for these components.
- **Quick shutdown:** *aR* fuses have a particularly fast tripping response in the event of a short circuit, thereby limiting the fault current and the energy impact on the semiconductors.
- **Selectivity in the DC link:** Each frequency converter is individually protected so that a fault does not take the entire DC link network out of operation.

**Special features of type a (aR)**

- **"a" = "connection protection"**: These fuses only trip in the event of a short circuit (no overload protection!).
- **"R" = "Rectifier" (semiconductor protection)**: They are optimised for the special requirements of semiconductors.
- They **must therefore always be used in combination with other protective measures**, e.g. motor protection switches or electronic overcurrent monitoring, as they do not provide thermal protection in the overload range.

**Conclusion**

Type aR fuses are a key protective element in the DC link connection of frequency converters. They ensure that sensitive power semiconductors are reliably protected in the event of a short circuit and that consequential damage is minimised. However, to fully protect the drive system, a coordinated combination of aR fuses and other protective devices is required.

**NOTICE****Observe the rated voltage of the fuse!**

- a) The rated voltage of the fuse must be at least equal to the maximum DC supply voltage of the drive controller.

## General characteristics

| Maximum DC supply voltage of the drive controller | Fuse    |
|---------------------------------------------------|---------|
| DC 622 V (565 V + 10 %)                           | Type aR |

Tab. 12: General characteristics of fuses

| Housing | Drive controller | Device power | Manufacturer | Item number <sup>1</sup>                                                                                                                                     | recommended fuse | SCCR  |
|---------|------------------|--------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------|
| 2       | 12F6xx2-xxxx     | 4.0 kW       | SIBA         | 50 118 06.xx<br>50 120 06.xx<br>50 201 06.xx<br>50 204 34.xx<br>50 215 06.xx<br>50 250 06.xx<br>50.268 06.xx<br>50 280 06.xx                                 | 25 A             | 30 kA |
|         |                  |              | Bussmann     | FWP-xxA14F<br>FWP-xxA22F<br>170M1361<br>170M1411                                                                                                             |                  |       |
| 2       | 13F6xx2-xxxx     | 5.5 kW       | SIBA         | 50 118 06.xx<br>50 120 06.xx<br>50 201 06.xx<br>50 204 34.xx<br>50 215 06.xx<br>50 250 06.xx<br>50 268 06.xx<br>50 280 06.xx<br>20 209 37.xx<br>20 556 34.xx | 32 A             | 30 kA |
|         |                  |              | Bussmann     | FWP-xxA14F<br>FWP-xxA22F                                                                                                                                     |                  |       |

| Housing | Drive controller | Device power | Manufacturer | Item number <sup>1</sup>                                                                                                                                     | recom-<br>mended<br>fuse | SCCR  |
|---------|------------------|--------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------|
| 2       | 14F6xx2-xxxx     | 7.5 kW       | SIBA         | 50 118 06.xx<br>50 120 06.xx<br>50 201 06.xx<br>50 204 34.xx<br>50 215 06.xx<br>50 250 06.xx<br>50.268 06.xx<br>50 280 06.xx<br>20 209 37.xx<br>20 556 34.xx | 40 A                     | 30 kA |
|         |                  |              | Bussmann     | FWP-xxA14F<br>FWP-xxA22F<br>170M1361<br>170M1411<br>170M1413<br>170M1752<br>170M1804                                                                         |                          |       |
|         |                  |              | Littelfuse   | L70QS0xx                                                                                                                                                     |                          |       |
| 2       | 15F6xx2-xxxx     | 11 kW        | SIBA         | 50 118 06.xx<br>50 201 06.xx<br>50 250 06.xx<br>50 268 06.xx<br>50 280 06.xx<br>20 209 37.xx<br>20 556 34.xx                                                 | 63 A                     | 30 kA |
|         |                  |              | Bussmann     | FWP-xxA22F<br>170M1413<br>170M1414<br>170M1415<br>170M1752<br>170M1804                                                                                       |                          |       |
|         |                  |              | Littelfuse   | L70QS0xx                                                                                                                                                     |                          |       |
| 2       | 16F6xx2-xxxx     | 15 kW        | SIBA         | 50 118 06.xx<br>50 201 06.xx<br>50 250 06.xx<br>50 268 06.xx<br>50 280 06.xx<br>20 209 37.xx<br>20 556 34.xx                                                 | 80 A                     | 30 kA |
|         |                  |              | Bussmann     | FWP-xxA22F<br>170M1316<br>170M1366<br>170M1415<br>170M1466<br>170M1752                                                                                       |                          |       |
|         |                  |              | Littelfuse   | L70QS0xx                                                                                                                                                     |                          |       |
| 3       | 17F6xx3-xxxx     | 18.5 kW      | SIBA         | 50 250 06.80<br>20 209 37.100<br>50 280 06.100<br>50 268 06.125<br>20 031 34.125                                                                             | 90 A                     | 50 kA |

| Housing | Drive controller | Device power | Manufacturer                       | Item number <sup>1</sup>                                                                                                                 | recom-<br>mended<br>fuse | SCCR  |
|---------|------------------|--------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------|
|         |                  |              | Bussmann<br>Littelfuse             | FWP-100A22F<br>170M1420<br>L70QS200                                                                                                      |                          |       |
| 3       | 18F6xx3-xxxx     | 22 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>20 209 37.100<br>50 280 06.100<br>50 268 06.125<br>20 031 34.125<br>FWP-100A22F<br>170M1420<br>L70QS200                  | 100 A                    | 50 kA |
| 3       | 19F6xx3-xxxx     | 30 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>20 209 37.100<br>50 280 06.100<br>50 268 06.125<br>20 031 34.125<br>FWP-100A22F<br>170M1420<br>L70QS200                  | 125 A                    | 50 kA |
| 3       | 20F6xx3-xxxx     | 37 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>20 209 37.100<br>50 280 06.100<br>50 268 06.125<br>20 031 34.125<br>FWP-100A22F<br>170M1420<br>L70QS200                  | 150 A                    | 50 kA |
| 4       | 18F6xx4-xxxx     | 22 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>50 280 06.100<br>20 209 37.100<br>50 268 06.125<br>20 557 34.250<br>20 031 34.250<br>FWP-100A22F<br>170M1422<br>L70QS500 | 100 A                    | 50 kA |
| 4       | 19F6xx4-xxxx     | 30 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>50 280 06.100<br>20 209 37.100<br>50 268 06.125<br>20 557 34.250<br>20 031 34.250<br>FWP-100A22F<br>170M1422<br>L70QS500 | 125 A                    | 50 kA |
| 4       | 20F6xx4-xxxx     | 37 kW        | SIBA                               | 50 250 06.80<br>50 280 06.100<br>20 209 37.100                                                                                           | 150 A                    | 50 kA |

| Housing | Drive controller | Device power | Manufacturer                       | Item number <sup>1</sup>                                                                                                                 | recom-<br>mended<br>fuse | SCCR  |
|---------|------------------|--------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------|
|         |                  |              | Bussmann<br>Littelfuse             | 50 268 06.125<br>20 557 34.250<br>20 031 34.250<br>FWP-100A22F<br>170M1422<br>L70QS500                                                   |                          |       |
| 4       | 21F6xx4-xxxx     | 45 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>50 280 06.100<br>20 209 37.100<br>50 268 06.125<br>20 557 34.250<br>20 031 34.250<br>FWP-100A22F<br>170M1422<br>L70QS500 | 160 A                    | 50 kA |
| 4       | 22F6xx4-xxxx     | 55 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 50 250 06.80<br>50 280 06.100<br>20 209 37.100<br>50 268 06.125<br>20 557 34.250<br>20 031 34.250<br>FWP-100A22F<br>170M1422<br>L70QS500 | 200 A                    | 50 kA |
| 6       | 21F6xx6-xxxx     | 45 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 20 557 34.250<br>20 568 34.315<br>20 031 34.315<br>170M1422<br>170M4245<br>L70QS500                                                      | 160 A                    | 50 kA |
| 6       | 22F6xx6-xxxx     | 55 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 20 557 34.250<br>20 568 34.315<br>20 031 34.315<br>170M1422<br>170M4245<br>L70QS500                                                      | 225 A                    | 50 kA |
| 6       | 23F6xx6-xxxx     | 75 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 20 557 34.250<br>20 568 34.315<br>20 031 34.315<br>170M1422<br>170M4245<br>L70QS500                                                      | 250 A                    | 50 kA |
| 6       | 24F6xx6-xxxx     | 90 kW        | SIBA<br><br>Bussmann<br>Littelfuse | 20 557 34.250<br>20 568 34.315<br>20 031 34.315<br>170M1422<br>170M4245<br>L70QS500                                                      | 315 A                    | 50 kA |

| Housing | Drive controller | Device power | Manufacturer                       | Item number <sup>1</sup>                                              | recommended fuse | SCCR  |
|---------|------------------|--------------|------------------------------------|-----------------------------------------------------------------------|------------------|-------|
| 7       | 25F6xx7-xxxx     | 110 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6245<br>PSR073DL0700                 | 350 A            | 85 kA |
| 7       | 26F6xx7-xxxx     | 132 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6245<br>PSR073DL0700                 | 400 A            | 85 kA |
| 7       | 27F6xx7-xxxx     | 160 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6245<br>PSR073DL0700                 | 500 A            | 85 kA |
| 7       | 28F6xx7-xxxx     | 200 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6245<br>PSR073DL0700                 | 630 A            | 85 kA |
| 8       | 27F6xx8-xxxx     | 160 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6199<br>PSR073DL0700<br>PSX3XLDB0900 | 500 A            | 85 kA |
| 8       | 28F6xx8-xxxx     | 200 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6199<br>PSR073DL0700<br>PSX3XLDB0900 | 630 A            | 85 kA |
| 8       | 29F6xx8-xxxx     | 260 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6199<br>PSR073DL0700<br>PSX3XLDB0900 | 700 A            | 85 kA |
| 8       | 30F6xx8-xxxx     | 315 kW       | SIBA<br>Bussmann<br><br>Littelfuse | 20 568 34.400<br>170M4246<br>170M6199<br>PSR073DL0700<br>PSX3XLDB0900 | 900 A            | 85 kA |
| 9       | 29F6xx9-xxxx     | 250 kW       | Bussmann<br>Littelfuse             | 170M6150<br>PSR073DL0700<br>PSX3XLDB1400                              | 700 A            | 85 kA |
| 9       | 30F6xx9-xxxx     | 315 kW       | Bussmann<br>Littelfuse             | 170M6150<br>PSR073DL0700                                              | 900 A            | 85 kA |

| Housing | Drive controller | Device power | Manufacturer           | Item number <sup>1</sup>                 | recom-<br>mended<br>fuse | SCCR  |
|---------|------------------|--------------|------------------------|------------------------------------------|--------------------------|-------|
|         |                  |              |                        | PSX3XLDB1400                             |                          |       |
| 9       | 31F6xx9-xxxx     | 355 kW       | Bussmann<br>Littelfuse | 170M6150<br>PSR073DL0700<br>PSX3XLDB1400 | 1000 A                   | 85 kA |
| 9       | 32F6xx9-xxxx     | 400 kW       | Bussmann<br>Littelfuse | 170M6150<br>PSR073DL0700<br>PSX3XLDB1400 | 1100 A                   | 85 kA |
| 9       | 33F6xx9-xxxx     | 450 kW       | Bussmann<br>Littelfuse | 170M6150<br>PSR073DL0700<br>PSX3XLDB1400 | 1250 A                   | 85 kA |

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 13: Protection according to IEC 400V class

### 3.2.2 COMBIVERT S6

#### 3.2.2.1 AC power supply

##### 3.2.2.1.1 230V class

##### 3.2.2.1.1.1 Type gG fuse

| Housing | Drive controller | Device power | Maximum fuse | SCCR  |
|---------|------------------|--------------|--------------|-------|
| 2       | 07S6xx2-xxxx     | 0.75 kW      | 15 A         | 30 kA |
| 2       | 09S6xx2-xxxx     | 1.5 kW       | 20 A         | 30 kA |

Tab. 14: 230 V-class protection (single-phase) in accordance with IEC

| Housing | Drive controller | Performance | Maximum fuse | SCCR  |
|---------|------------------|-------------|--------------|-------|
| 2       | 07S6xx2-xxxx     | 0.75 kW     | 6 A          | 30 kA |
| 2       | 09S6xx2-xxxx     | 1.5 kW      | 10 A         | 30 kA |
| 2       | 10S6xx2-xxxx     | 2.2 kW      | 10 A         | 30 kA |
| 4       | 12S6xx4-xxxx     | 4.0 kW      | 16 A         | 30 kA |
| 4       | 13S6xx4-xxxx     | 5.5 kW      | 20 A         | 30 kA |
| 4       | 14S6xx4-xxxx     | 7.5 kW      | 25 A         | 30 kA |

Tab. 15: 230 V-class protection (3-phase) in accordance with IEC

##### 3.2.2.1.2 400V class

##### 3.2.2.1.2.1 Type gG fuse

| Housing | Drive controller | Device power | Maximum fuse | SCCR  |
|---------|------------------|--------------|--------------|-------|
| 2       | 07S6xx2-xxxx     | 0.75 kW      | 6 A          | 30 kA |
| 2       | 09S6xx2-xxxx     | 1.5 kW       | 10 A         | 30 kA |
| 2       | 10S6xx2-xxxx     | 2.2 kW       | 10 A         | 30 kA |
| 4       | 12S6xx4-xxxx     | 4.0 kW       | 16 A         | 30 kA |
| 4       | 13S6xx4-xxxx     | 5.5 kW       | 20 A         | 30 kA |
| 4       | 14S6xx4-xxxx     | 7.5 kW       | 25 A         | 30 kA |

Tab. 16: Protection according to IEC 400V class

3.2.2.2 DC power supply

3.2.2.2.1 400V class

## 4 Scope of application UL/CSA

### 4.1 Validity

The protective devices described in this section are intended for use in branch circuits in accordance with the National Electrical Code (NEC) for the United States and the Canadian Electrical Code (CEC) Part 1 for Canada. Other local or national standards and regulations must be checked for use.

### 4.2 COMBILINE

#### 4.2.1 COMBILINE E4

##### 4.2.1.1 AC power supply

##### 4.2.1.1.1 480/277V class

##### 4.2.1.1.1.1 Class J fuse

| Filter       | For inverter power up to | Manufacturer | Type   | Maximum fuse | Fuse Class | SCCR   |
|--------------|--------------------------|--------------|--------|--------------|------------|--------|
| 26E4T60-1001 | 132 kW                   | Mersen       | HSJ300 | 300 A        | Class J    | 100 kA |
| 28E4T60-1001 | 200 kW                   | Mersen       | HSJ500 | 500 A        | Class J    | 100 kA |
| 30E4T60-1001 | 315 kW                   | Mersen       | HSJ600 | 600 A        | Class J    | 100 kA |

Tab. 17: Certification in accordance with UL/CSA U<sub>N</sub>: 480/277 V

##### 4.2.1.1.1.2 Semiconductor fuses

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|------|
| 26E4T60-1001 | 132 kW                   | SIBA         | 20 610 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 611 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 612 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 613 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 614 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 615 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 616 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 618 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 660 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 661 32.315            | 315 A     | 100 kA | UL   |
|              |                          |              | 20 664 32.315            | 315 A     | 100 kA | UL   |
|              |                          | Bussmann     | 170M4141                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4191                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4241                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4441                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4491                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4691                 | 315 A     | 100 kA | UL   |
|              |                          |              | 170M4741                 | 315 A     | 100 kA | UL   |
|              |                          | Littelfuse   | PSR030DL0315             | 315 A     | 100 kA | UL   |
|              |                          |              | PSR030DS0315             | 315 A     | 100 kA | UL   |
|              |                          |              | PSR030FL0315             | 315 A     | 100 kA | UL   |
|              |                          |              | PSR030FS0315             | 315 A     | 100 kA | UL   |

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|------|
|              |                          |              | PSR030UL0315             | 315 A     | 100 kA | UL   |
|              |                          |              | PSR030US0315             | 315 A     | 100 kA | UL   |
| 28E4T60-1001 | 200 kW                   | SIBA         | 20 620 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 621 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 622 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 623 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 624 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 625 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 626 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 628 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 630 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 631 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 632 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 633 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 634 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 635 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 636 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 638 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 660 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 661 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 664 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 670 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 671 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 674 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 680 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 681 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 684 32.500            | 500 A     | 100 kA | UL   |
|              |                          | Bussmann     | 170M3521                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3471                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3621                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3271                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3121                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3721                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3371                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3671                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3221                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3021                 | 500 A     | 100 kA | UL   |
|              |                          | Littelfuse   | 170M3571                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3321                 | 500 A     | 100 kA | UL   |
|              |                          |              | L70QS500                 | 500A      | 100 kA | UL   |
| 30E4T60-1001 | 315 kW                   | SIBA         | 20 610 32.630            | 630 A     | 100 kA | UL   |

| Filter | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------|--------------------------|--------------|--------------------------|-----------|--------|------|
|        |                          |              | 20 611 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 612 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 613 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 614 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 615 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 616 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 618 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 620 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 621 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 622 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 623 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 624 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 625 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 626 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 628 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 630 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 631 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 632 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 633 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 634 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 635 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 636 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 638 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 660 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 661 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 664 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 666 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 670 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 671 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 674 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 680 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 681 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 684 32.630            | 630 A     | 100 kA | UL   |
|        |                          | Bussmann     | 170M3023                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3123                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3273                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3473                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3573                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3623                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3673                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3723                 | 630 A     | 100 kA | UL   |

| Filter | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------|--------------------------|--------------|--------------------------|-----------|--------|------|
|        |                          | Littelfuse   | 170M3773                 | 630 A     | 100 kA | UL   |
|        |                          |              | L70QS600                 | 600 A     | 100 kA | UL   |

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 18: UL-compliant 480/277 V-class protection

## 4.2.2 COMBILINE E6

### 4.2.2.1 AC power supply

#### 4.2.2.1.1 480/277V class

##### 4.2.2.1.1.1 Fuse Class RK5 / J / L

| Filter       | For inverter power up to | Maximum fuse | Fuse Class | SCCR  |
|--------------|--------------------------|--------------|------------|-------|
| 14E6T60-3000 | 7.5 kW                   | 30 A         | RK 5       | 5 kA  |
| 14E6T60-3000 | 7.5 kW                   | 30 A         | Class J    | 30 kA |
| 14E6T60-4100 | 7.5 kW                   |              |            |       |
| 16E6T60-3000 | 15 kW                    | 50 A         | RK 5       | 5 kA  |
| 16E6T60-3000 | 15 kW                    | 50 A         | Class J    | 30 kA |
| 16E6T60-4100 | 15 kW                    |              |            |       |
| 17E6T60-4100 | 18.5 kW                  |              |            |       |
| 18E6T60-3000 | 22 kW                    | 70 A         | RK 5       | 5 kA  |
| 18E6T60-3000 | 22 kW                    | 70 A         | Class J    | 30 kA |
| 18E6T60-4100 | 22 kW                    |              |            |       |
| 19E6T60-4100 | 30 kW                    |              |            |       |
| 20E6T60-3xxx | 37 kW                    | 100 A        | RK 5       | 10 kA |
| 20E6T60-3xxx | 37 kW                    | 100 A        | Class J    | 30 kA |
| 20E6T60-4100 | 37 kW                    |              |            |       |
| 21E6T60-4100 | 45 kW                    |              |            |       |
| 22E6T60-3xxx | 55 kW                    | 175 A        | RK 5       | 10 kA |
| 22E6T60-3xxx | 55 kW                    | 175 A        | Class J    | 30 kA |
| 22E6T60-4100 | 55 kW                    |              |            |       |
| 22E6T60-5150 | 55 kW                    | 150 A        | Class J    | 10 kA |
| 23E6T60-5150 | 75 kW                    | 175 A        | Class J    | 10 kA |
| 24E6T60-3xxx | 90 kW                    | 250 A        | RK 5       | 10 kA |
| 24E6T60-3xxx | 90 kW                    | 250 A        | Class J    | 30 kA |
| 24E6T60-5150 | 90 kW                    | 200 A        | Class J    | 10 kA |
| 27E6T60-1150 | 160 kW                   | 350 A        | Class J    | 10 kA |
| 28E6T60-1150 | 200 kW                   | 400 A        | Class J    | 18 kA |
| 30E6T60-1150 | 315 kW                   | 600 A        | Class J    | 30 kA |
| 33E6T60-3150 | 450 kW                   | 900 A        | Class L    | 42 kA |

Tab. 19: 480/277 V-class protection with a fuse in accordance with UL

## 4.2.2.1.1.2 Semiconductor fuses

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|------|
| 22E6T60-5150 | 55 kW                    | SIBA         | 20 189 20.160            | 160 A     | 30 kA  | UL   |
|              |                          | Bussmann     | 170M1369                 | 160 A     | 30 kA  | UL   |
|              |                          | Littelfuse   | L70QS175                 | 175 A     | 30 kA  | UL   |
| 23E6T60-5150 | 75 kW                    | SIBA         | 20 189 20.180            | 180 A     | 30 kA  | UL   |
|              |                          | Bussmann     | 170M1370                 | 200 A     | 30 kA  | UL   |
|              |                          | Littelfuse   | L70QS200                 | 200 A     | 30 kA  | UL   |
| 24E6T60-5150 | 90 kW                    | SIBA         | 20 189 20.200            | 200 A     | 30 kA  | UL   |
|              |                          | Bussmann     | 170M1370                 | 200 A     | 30 kA  | UL   |
|              |                          | Littelfuse   | L70QS200                 | 200 A     | 30 kA  | UL   |
| 27E6T60-1150 | 160 kW                   | SIBA         | 20 610 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 612 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 613 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 614 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 615 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 616 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 618 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 620 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 623 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 624 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 625 32 350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 660 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 661 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 664 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 670 32.350            | 350 A     | 100 kA | UL   |
|              |                          |              | 20 671 32.350            | 350 A     | 100 kA | UL   |
|              |                          | Bussmann     | 170M4111                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4161                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4461                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4261                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4761                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4661                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4711                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4611                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4061                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4561                 | 350 A     | 100kA  | UL   |
|              |                          |              | 170M4011                 | 350 A     | 100kA  | UL   |
|              |                          | Littelfuse   | PSR030DL0350             | 350 A     | 100kA  | UL   |
|              |                          |              | PSR030DS0350             | 350 A     | 100kA  | UL   |
|              |                          |              | PSR030FL0350             | 350 A     | 100kA  | UL   |
|              |                          |              | PSR030FS0350             | 350 A     | 100kA  | UL   |

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|------|
|              |                          |              | PSR030UL0350             | 350 A     | 100kA  | UL   |
|              |                          |              | PSR030US0350             | 350 A     | 100kA  | UL   |
| 28E6T60-1150 | 200 kW                   | SIBA         | 20 620 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 621 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 622 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 623 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 624 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 625 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 626 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 628 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 630 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 631 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 632 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 633 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 634 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 635 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 636 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 638 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 660 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 661 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 664 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 670 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 671 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 674 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 680 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 681 32.500            | 500 A     | 100 kA | UL   |
|              |                          |              | 20 684 32.500            | 500 A     | 100 kA | UL   |
|              |                          | Bussmann     | 170M3521                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3471                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3621                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3271                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3121                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3721                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3371                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3671                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3221                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3021                 | 500 A     | 100 kA | UL   |
|              |                          | Littelfuse   | 170M3571                 | 500 A     | 100 kA | UL   |
|              |                          |              | 170M3321                 | 500 A     | 100 kA | UL   |
|              |                          |              | L70QS500                 | 500A      | 100 kA | UL   |
| 30E6T60-1150 | 315 kW                   | SIBA         | 20 610 32.630            | 630 A     | 100 kA | UL   |

| Filter | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------|--------------------------|--------------|--------------------------|-----------|--------|------|
|        |                          |              | 20 611 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 612 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 613 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 614 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 615 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 616 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 618 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 620 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 621 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 622 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 623 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 624 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 625 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 626 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 628 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 630 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 631 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 632 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 633 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 634 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 635 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 636 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 638 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 660 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 661 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 664 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 666 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 670 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 671 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 674 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 680 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 681 32.630            | 630 A     | 100 kA | UL   |
|        |                          |              | 20 684 32.630            | 630 A     | 100 kA | UL   |
|        |                          | Bussmann     | 170M3023                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3123                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3273                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3473                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3573                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3623                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3673                 | 630 A     | 100 kA | UL   |
|        |                          |              | 170M3723                 | 630 A     | 100 kA | UL   |

| Filter       | For inverter power up to | Manufacturer | Item number <sup>1</sup> | Fuse size | SCCR   | Note |
|--------------|--------------------------|--------------|--------------------------|-----------|--------|------|
|              |                          | Littelfuse   | 170M3773                 | 630 A     | 100 kA | UL   |
|              |                          |              | L70QS600                 | 600 A     | 100 kA | UL   |
| 33E6T60-3150 | 450 kW                   | SIBA         | 20 620 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 621 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 622 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 623 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 624 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 625 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 626 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 628 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 630 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 631 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 632 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 633 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 634 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 635 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 636 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 638 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 670 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 671 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 674 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 680 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 681 32.900            | 900 A     | 100 kA | UL   |
|              |                          |              | 20 684 32.900            | 900 A     | 100 kA | UL   |
|              |                          | Bussmann     | 170M5265                 | 900 A     | 100 kA | UL   |
|              |                          |              | 170M5065                 | 900 A     | 100 kA | UL   |
|              |                          |              | 170M5165                 | 900 A     | 100 kA | UL   |
|              |                          |              | 170M5465                 | 900 A     | 100 kA | UL   |
|              |                          | Littelfuse   | PSR032DS0900             | 900 A     | 100 kA | UL   |
|              |                          |              | PSR032DL0900             | 900 A     | 100 kA | UL   |
|              |                          |              | PSR032FS0900             | 900 A     | 100 kA | UL   |
|              |                          |              | PSR032FL0900             | 900 A     | 100 kA | UL   |
|              |                          |              | PSR032US0900             | 900 A     | 100 kA | UL   |
|              |                          |              | PSR032UL0900             | 900 A     | 100 kA | UL   |

<sup>1</sup> xx must be replaced with the value of the recommended fuse or a lower value (if permitted for the application).

Tab. 20: 480/277 V-class protection in accordance with UL/CSA

### 4.3 COMBIVERT

#### 4.3.1 COMBIVERT F6

##### 4.3.1.1 AC power supply

##### 4.3.1.1.1 240V class

##### 4.3.1.1.1.1 Class J fuse

| Housing | Drive controller | Device power | Maximum fuse | SCCR  |
|---------|------------------|--------------|--------------|-------|
| 2       | 10F6xx2-xxxx     | 2.2 kW       | 25 A         | 5 kA  |
| 2       | 12F6xx2-xxxx     | 4.0 kW       | 40 A         | 5 kA  |
| 2       | 13F6xx2-xxxx     | 5.5 kW       | 50 A         | 5 kA  |
| 2       | 14F6xx2-xxxx     | 7.5 kW       | 70 A         | 5 kA  |
| 3       | 15F6xx3-xxxx     | 11 kW        | 80 A         | 5 kA  |
| 3       | 16F6xx3-xxxx     | 15 kW        | 90 A         | 5 kA  |
| 3       | 17F6xx3-xxxx     | 18.5 kW      | 110 A        | 5 kA  |
| 4       | 18F6xx4-xxxx     | 22 kW        | 125 A        | 5 kA  |
| 6       | 18F6xx6-xxxx     | 22 kW        | 150 A        | 10 kA |
| 6       | 19F6xx6-xxxx     | 30 kW        | 175 A        | 10 kA |
| 6       | 20F6xx6-xxxx     | 37 kW        | 200 A        | 10 kA |
| 6       | 21F6xx6-xxxx     | 45 kW        | 250 A        | 10 kA |

Tab. 21: Certification in accordance with UL/CSA U<sub>N</sub>: 240 V (single-phase)

##### 4.3.1.1.2 480/277V class

##### 4.3.1.1.2.1 Class J fuse

Legend:

std: Standard

hsd: High-speed drive

pp: Peak Power

| Housing | Drive controller | Device power | Maximum fuse | SCCR  |
|---------|------------------|--------------|--------------|-------|
| 2       | 12F6xx2-xxxx     | 4.0 kW       | 15 A         | 5 kA  |
| 2       | 13F6xx2-xxxx     | 5.5 kW       | 20 A         | 5 kA  |
| 2       | 14F6xx2-xxxx     | 7.5 kW       | 25 A         | 5 kA  |
| 2 (pp)  | 15F6xx2-x(D/E)xx | 11 kW        | 30 A         | 5 kA  |
| 2 (std) | 15F6xx2-xxxx     | 11 kW        | 35 A         | 5 kA  |
| 2       | 16F6xx2-xxxx     | 15 kW        | 50 A         | 5 kA  |
| 3       | 17F6xx3-xxxx     | 18.5 kW      | 315A         | 5 kA  |
| 3       | 18F6xx3-xxxx     | 22 kW        | 60 A         | 5 kA  |
| 3       | 19F6xx3-xxxx     | 30 kW        | 70 A         | 5 kA  |
| 3       | 20F6xx3-xxxx     | 37 kW        | 90 A         | 5 kA  |
| 4       | 18F6xx4-xxxx     | 22 kW        | 60 A         | 5 kA  |
| 4 (pp)  | 19F6xx4-x(D/E)xx | 30 kW        | 70 A         | 5 kA  |
| 4       | 19F6xx4-xxxx     | 30 kW        | 80 A         | 5 kA  |
| 4       | 20F6xx4-xxxx     | 37 kW        | 100 A        | 5 kA  |
| 4       | 21F6xx4-xxxx     | 45 kW        | 125 A        | 5 kA  |
| 4       | 22F6xx4-xxxx     | 55 kW        | 125 A        | 10 kA |
| 6       | 21F6xx6-xxxx     | 45 kW        | 110 A        | 10 kA |

| Housing | Drive controller  | Device power | Maximum fuse | SCCR  |
|---------|-------------------|--------------|--------------|-------|
| 6       | 22F6xx6-xxxx      | 55 kW        | 150 A        | 10 kA |
| 6       | 23F6xx6-xxxx      | 75 kW        | 175 A        | 10 kA |
| 6       | 24F6xx6-xxxx      | 90 kW        | 200 A        | 10 kA |
| 7       | 25F6xx7-xxxx      | 110 kW       | 250 A        | 18 kA |
| 7 (hsd) | 26F6xx7-x(B/C)xx  | 132 kW       | 300 A        | 10kA  |
| 7       | 26F6xx7-xxxx      | 132 kW       | 300 A        | 18 kA |
| 7 (hsd) | 27F6xx7- x(B/C)xx | 160 kW       | 350 A        | 10 kA |
| 7       | 27F6xx7-xxxx      | 160 kW       | 350 A        | 18 kA |
| 7       | 28F6xx7-xxxx      | 200 kW       | 450 A        | 18 kA |
| 8       | 27F6xx8-xxxx      | 160 kW       | 400 A        | 18 kA |
| 8       | 28F6xx8-xxxx      | 200 kW       | 500 A        | 18 kA |
| 8       | 29F6xx8-xxxx      | 250 kW       | 600 A        | 18 kA |
| 8       | 30F6xx8-xxxx      | 315 kW       | 600 A        | 18 kA |
| 9       | 29F6xx9-xxxx      | 250 kW       | 600 A        | 18 kA |
| 9       | 30F6xx9-xxxx      | 315 kW       | 600 A        | 30 kA |
| 9       | 31F6xx9-xxxx      | 355 kW       | 700 A        | 30 kA |
| 9       | 32F6xx9-xxxx      | 400 kW       | 800 A        | 30 kA |
| 9       | 33F6xx9-xxxx      | 450 kW       | 900 A        | 42 kA |

Tab. 22: Certification in accordance with UL/CSA  $U_N$ : 480/277 V

#### 4.3.1.2 DC power supply

### 4.3.2 COMBIVERT S6

#### 4.3.2.1 AC power supply

##### 4.3.2.1.1 240V class

##### 4.3.2.1.2 480/277V class

#### 4.3.2.2 DC power supply



**Automation with Drive**

**[www.keb-automation.com](http://www.keb-automation.com)**

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