**Contents** **Page**

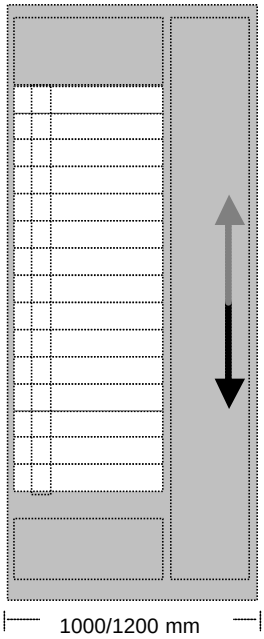
## General

In-line-type switching devices with supply-side plug-in contact offer an alternative to the withdrawable unit design. With their modular design, they enable easy and quick conversion or replacement under operating conditions.

## Structure and Function

The switching device compartment has a height of 1600 mm and is intended to accommodate plug-in modules with a 185 mm phase spacing. The cable connection compartment with the widths 400 mm or 600 mm is located on the right.

Cable connection at the side
Cable supply optional from below or top*
*Consider cable flange plates!




≤ IP 41 ventilated

**OFPD**

In-line type switching devices for outgoing feeders up to 630 A available in the following:

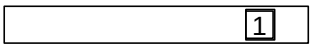
- Switch-disconnector fuse (single-break)
- Switch-disconnector-fuse (double-break) in each of the above cases with or without electronic fuse monitoring
- Switch-disconnector without fuses

**Device compartment** (200 mm, 300 mm, 400 mm high) for auxiliary devices and instruments consisting of:

- Door (no espagnolette lock with rod driven tumblers possible)
- Mounting plate
- With and without 400 A on plug-on bus system
- Available device installation depth 180 mm

## Installation of Instruments

1 = measuring instrument 48 x 48 mm




The plug-in modules enable to accommodate a measuring instrument 48 x 48 mm with 1-pole measuring. With 3-pole measuring the measuring instruments can be mounted into additional switching device compartment doors or into the cable compartment door. The belonging current transformers are installed on load side.

## Plug-on Bus System (3 and 4 pole)

The plug-on bus system with the phase conductors L1, L2, L3 is located on the rear of the cubicle. The IP 20 degree of protection is achieved by the optional shock hazard protection with tap openings and it enables to replace the plug-in modules under operating conditions.

**Rated current of plug-on bus system**

| Cross-section | Rated current $I_n$ depending on ambient temperature [A] ventilated | | | | | | |
|---|---|---|---|---|---|---|---|
| | 20° | 25° | 30° | **35°** | 40° | 45° | 50° |
| 60x10 | 1680 | 1640 | 1600 | **1560** | 1520 | 1480 | 1430 |
| 80x10 | 2260 | 2210 | 2155 | **2100** | 2045 | 1985 | 1925 |

**Short-circuit strength**
$I_{pk}$ = 110 kA
$I_{cw}$ = 50 kA,1 s

PE, PEN and N conductor bars are installed in the cable connection compartment. With 4-pole network systems the N conductor is assigned to the phase conductors L1, L2, L3.

PE-cross-section 1x40x5
PEN-, N-cross-section 1x40x10, 1x60x10 or 1x80x10

## Cable Connection Compartment

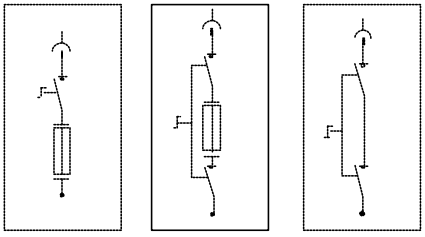
The cables are led on the right-hand side of the cable connection compartment.

**Cable connection possibilities**

| Plug-in module | Rated current [A] | **max. number and cross-sections of connected cables (3 ½-conductor)** [mm²] |
|---|---|---|
| 3NJ6110 | 160 | 1 x 95 |
| 3NJ6120 | 250 | 1 x 240 |
| 3NJ6140 | 400 | 2 x 240 |
| 3NJ6160 | 630 | 2 x 240 |

## Rated currents switch disconnector fuses 3NJ61

| 3NJ61 Type | Rated current [A] | Rated current $I_n$ depending on ambient temperature [A] ventilate 20° | 25° | 30° | **35°** | 40° | 45° | 50° |
|---|---|---|---|---|---|---|---|---|
| 3NJ6110 | 160 | 137 | 134 | 130 | **125** | 120 | 112 | 106 |
| 3NJ6120 | 250 | 220 | 215 | 210 | **200** | 190 | 180 | 170 |
| 3NJ6140 | 400 | 350 | 340 | 330 | **320** | 305 | 290 | 270 |
| 3NJ6160 | 630 | 550 | 535 | 520 | **500** | 475 | 450 | 425 |



a) b) c)

a) Switch-disconnector-fuse with fuse element featuring independent manually-actuated spring operating mechanism for LV HRC fuses (DIN), in sizes 00, 1, 2 and 3 (standard option)

b) Same as a), but with interruption on both sides of the fuses

c) Switch-disconnector with independent manually-actuated spring operating mechanism (same sizes as a)

## Space requirement

**Switch disconnector fuses 3NJ61**

| 3NJ61 Type | Rated current [A] | Size | Height requirements of modules [mm] 3-pol. | 4-pol. | Max. quantity per cubicle 3-pol. | 4-pol. |
|---|---|---|---|---|---|---|
| 3NJ6110 | 160 | 00 | 50 | 100 | 32 | 16 |
| 3NJ6120 | 250 | 1 | 100 | 150 | 16 | 10 |
| 3NJ6140 | 400 | 2 | 200 | 250 | 8 | 6 |
| 3NJ6160 | 630 | 3 | 200 | 250 | 8 | 6 |

**Further installations**

| **Designation** | **Height require-ment** |
|---|---|
| Blanking covers for empty compartments/connection module | 50 mm |
| Device compartment | 200 mm * |
| Device compartment | 300 mm * |
| Device compartment | 400 mm * |
| 400 A connection module for device compartment | + 50 mm |
| Group alarm indicator 1 - 35 plug-in module (AC) | -- |
| Group alarm indicator 1 - 50 plug-in module (DC) | -- |

*) max. useful device installation depth 180 mm

## Rated currents

**Rated currents of device sizes = 0,8 x $I_N$ of the largest fuse link**
for total current of all feeders in the cubicles ≤ 2000 A

| Size 00 50 mm high | | Size 1 100 mm high | | Size 2 200 mm high | | Size 3 200 mm high | |
|---|---|---|---|---|---|---|---|
| $I_N$ = 160 A Fuse | Rated current = 125 A | Fuse $I_N$ = 250 A | Rated current = 200 A | Fuse $I_N$ = 400 A | Rated current = 320 A | Fuse $I_N$ = 630 A | Rated current = 500 A |

**Rated current of small fuse links of one size = 0,8 x $I_N$ of the fuse link**

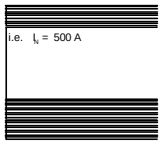
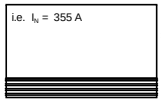
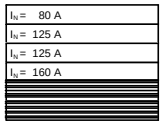
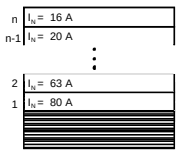
| Size 00 z. B. Fuse | Continuous load current | Size 1 z. B. Fuse | Continuous load current | Size 2 z. B. Fuse | Continuous load current | Size 3 z. B. Fuse | Continuous load current |
|---|---|---|---|---|---|---|---|
| $I_N$ = 125 A | x 0,8 =100 A | $I_N$ = 224 A | = 180 A | $I_N$ = 355 A | = 284 A | $I_N$ = 500 A | = 400 A |
| $I_N$ = 80 A | x 0,8 = 64 A | $I_N$ = 125 A | = 100 A | $I_N$ = 315 A | = 250 A | $I_N$ = 400 A | = 320 A |

## Projecting rules

**Projecting rule for ventilated cubicle s with plug-in modules 3NJ6:**
The diversity factor detailed in IEC 60439-1 applies to the completely assembled cubicle. If these notes are not observed, premature aging of fuses and uncontrolled release may occur as the result of local overheating.
All data refers to ambient temperatures of the switchboard amounting to 35 °C on the 24 h average.

**Conversion factors for other ambient temperatures:**

| Ambient temperature of the system [°C] | 20 | 25 | 30 | **35** | 40 | 45 | 50 | 55 |
|---|---|---|---|---|---|---|---|---|
| Conversion factor | 1,1 | 1,07 | 1,04 | **1,00** | 0,95 | 0,9 | 0,85 | 0,8 |

<table>
<tr><td rowspan="2">Rated current of fuse links:</td><td>Total current of all feeders in the cubicle ≤ 2000 A</td><td colspan="2">0.8 x $I_N$ of the fuse</td></tr>
<tr><td>Permitted exceptions:<br>Total current of all feeders in the cubicle ≤ 1500 A</td><td colspan="2">Sizes 00 to 2 0.90 x $I_N$<br>Size 3 0.85 x $I_N$<br>Group formation is no longer permitted here.<br>A 50 mm high blanking cover must assigned to each size 00 and 1 device.</td></tr>
<tr><td rowspan="2">Plug-in module arrangement:</td><td></td><td colspan="2">Installed in the cubicle from bottom to top, descending from size 3 to size 00</td></tr>
<tr><td>Plug-in modules<br>Size 2<br>Size 3</td><td colspan="2">In the case of<br>> 280 A continuous load current<br>> 440 A continuous load current<br>If possible, distribute plug-in modules over various cubicles.</td></tr>
<tr><td>Blanking covers<br>with ventilation slots<br>50 mm high</td><td>Permissible current<br>(continuous load current at 35 °C system ambient temperature)</td><td>Total covered height to be assigned<br>(see right-hand side for recommended arrangement of blanking covers)</td><td>Arrangement of plug-in modules + belonging blanking covers</td></tr>
<tr><td rowspan="2">Plug-in modules size 3<br>(group formation not permitted)</td><td>≥ 440 A to 500 A<br>of each single device</td><td>200 mm = 4 pieces per plug-in module</td><td>  <br>$I_N$ x 0.8 = 500 A<br>= permitted continuous load current</td></tr>
<tr><td>< 440 A<br>of each single device</td><td>150 mm = 3 pieces per plug-in module</td><td>  <br>$I_N$ x 0.8 = 400 A<br>= permitted continuous load current</td></tr>
<tr><td>Plug-in modules size 2<br>(group formation not permitted)</td><td>≤ 320 A<br>of each single device</td><td>50 mm = 1 pieces per plug-in module</td><td>  <br>$I_N$ x 0.8 = 284 A<br>= permitted continuous load current</td></tr>
<tr><td>Groups of plug-in modules<br>Sizes 00 and 1</td><td>≤ 400 A<br>= Total current of the fuse links Group x 0.8</td><td>100 mm = 2 pieces per group</td><td>  <br>Total $I_N$ x 0.8<br>≤ 400 A<br>= permitted continuous load current</td></tr>
<tr><td>Groups of unlimited size with plug-in modules size 00</td><td>≤ 64 A<br>of each single device</td><td>100 mm = 2 pieces per group<br>In combination with sizes 2 and 3 in one cubicle, the Size 2 rated currents = 280 A and Size 3 = 440 A.<br>Blanking covers must be assigned to devices belonging to Sizes 2 and 3 (see above).</td><td>  <br>(Total 1 to n $I_N$) x α<br>= permitted continuous load current<br>α = rated load factor<br>n = 4 and 5 α = 0,8<br>n = 6 to 9 α = 0,7<br>n ≥ 10 α = 0,6</td></tr>
</table>

**Allocation of blanking covers** with ventilation slots, 50 mm high:

| **Group Size 00** Total current of group £ **500 A** | Permitted continuous load current £ **400 A** | **Group Size 1** Total current of group **= 500 A** | Permitted continuous load current £ **400 A** | **Single device Size 2** | Permitted continuous load current of each single device £ **320 A** | **Single device Size 3** | Permitted continuous load current of each single device £ **440 A** |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| $I_N$ = 80 A | Total current of group 490 A x 0,8 = 392 A ✓ 2 blanking covers/group | Fuse $I_N$ = 250 A | Total current of group 500 A x 0,8 = 400 A ✓ 2 blanking covers/group | z. B. Fuse $I_N$ = 355 A | 0,8 x $I_N$ = 280 A ✓ 1 blanking cover/device | z. B. Fuse $I_N$ = 500 A | 0,8 x $I_N$ = 400 A ✓ 3 blanking covers/device |
| $I_N$ = 125 A | | Fuse $I_N$ = 250 A | | | | | |
| $I_N$ = 125 A | | | | | | | |
| $I_N$ = 160 A | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| **Group Size 00 and 1** | Total current of group 490 A x 0,8 = 392 A ✓ 2 blanking covers/group | z. B. Fuse $I_N$ = 630 A | 440 A > I £ **500 A** = 500 A ✓ 4 blanking covers/device |
|---|---|---|---|
| | | | |
| $I_N$ = 40 A | | | |
| $I_N$ = 100 A | | | |
| $I_N$ = 100 A | | | |
| Fuse $I_N$ = 250 A | | | |
| | | | |
| | | | |

| **Group Size 00** Size 00 with $I_N \leq$ 80 A | Permitted continuous load current of each single device £ **64 A** Any group size, up to 33 plug-in modules/cubicle | **Example:** Group Size 00 and Size 2 and 3 | For combination of size 00 with $I_N \leq$ 80 A with other sizes, in the cases of sizes 2 to 3 the rated currents must be reduced to 0,7 x $I_N$ : |
|---|---|---|---|
| $I_N$ = 20 A | 16 A | $I_N$ = 20 A | The allocation of blanking covers for device sizes 1 to 3 must be observed (see adjacent example of an incomplete line-up of cubicle components)! |
| $I_N$ = 32 A | 26 A | $I_N$ = 32 A | |
| $I_N$ = 32 A | 26 A | $I_N$ = 32 A | |
| $I_N$ = 40 A | 32 A | $I_N$ = 40 A | |
| $I_N$ = 40 A | 32 A | $I_N$ = 40 A | |
| $I_N$ = 50 A | 40 A | $I_N$ = 50 A | |
| $I_N$ = 50 A | 40 A | $I_N$ = 50 A | |
| $I_N$ = 80 A | 64 A | $I_N$ = 80 A | |
| $I_N$ = 80 A | 64 A | $I_N$ = 80 A | |
| $I_N$ = 80 A | 64 A | $I_N$ = 80 A | |
| $I_N$ = 80 A | 64 A | $I_N$ = 80 A | |
| $I_N$ = 80 A | 64 A | $I_N$ = 80 A | |
| | 2 blanking covers/group | | |
| | | Size 2 $I_N$ = 400 A | Rated current: **280 A** |
| | | Size 3 $I_N$ = 630 A | Rated current: **440 A** |