

Engineering information

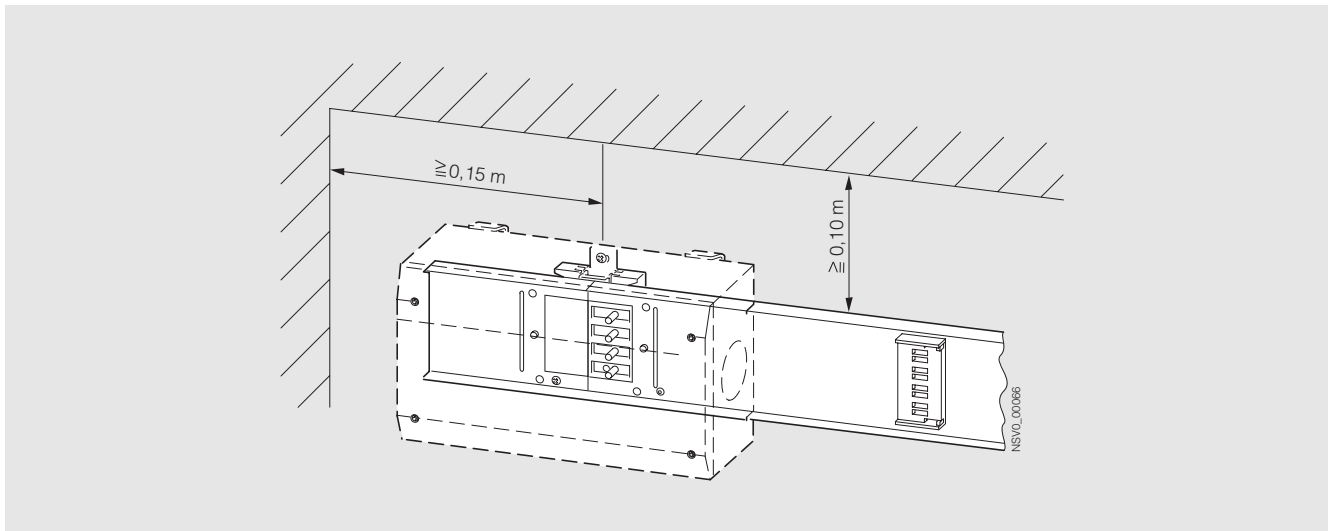
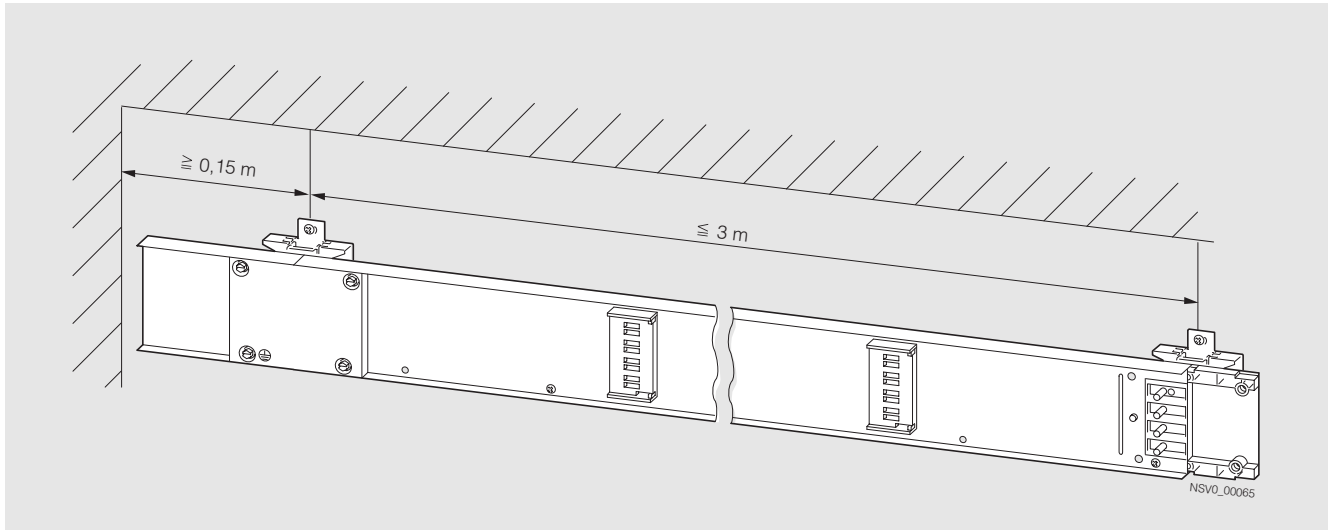
Overview

Specimen text for tenders

| Item | Quantity | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Unit price |  | Amount |  |
|------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--|--------|--|
|      | ... m    | <p>Busbar trunking system (see Appendix for diagram)</p> <ul style="list-style-type: none"><li>• As type-tested low-voltage switchgear and controlgear assembly (TTA) according to IEC/EN 60439-1 and -2</li><li>• Rated current, corresponds to thermal rated current at max. +40 °C and +35 °C on a 24 h average for indoor installation</li><li>• Rated insulation voltage <math>U_i</math> = 400 V AC, 400 V DC; overvoltage category/pollution degree III/3</li><li>• Operational voltage ... V, ... Hz</li><li>• Rated peak withstand current of busbar trunking system, ... kA tested to IEC/EN 60439-1</li><li>• Degree of protection IP54 with tap-off points at sides and bottom, otherwise IP50; increase to IP55 with accessories</li><li>• 5-conductor system: L1, L2, L3, N, PE</li><li>• Busbars: silver-plated Cu connection and pick-up contacts; Al or Cu conductors; supported by insulated busbar supports</li><li>• Trunking units steel enclosed, galvanized and with paint finish; color: light gray, RAL 7035</li><li>• Halogen-free</li><li>• Busbar connection via clamp terminal with built-in expansion compensation</li><li>• Tap-off points on one side, every 0.5 m or 1 m</li><li>• Supplied ready for connection with all assembly parts</li><li>• Made by Siemens</li><li>• Type BD01-...</li></ul> <p>Comprising:</p> |            |  |        |  |

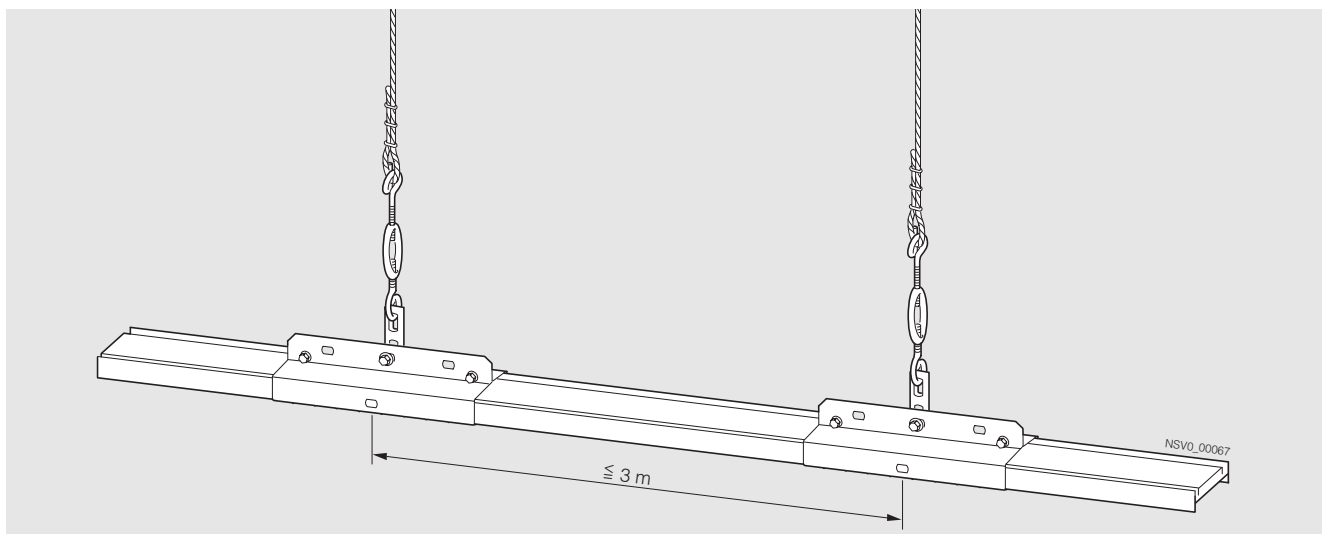
**Design****Fixing**

Wall or ceiling mounting with BD01-B

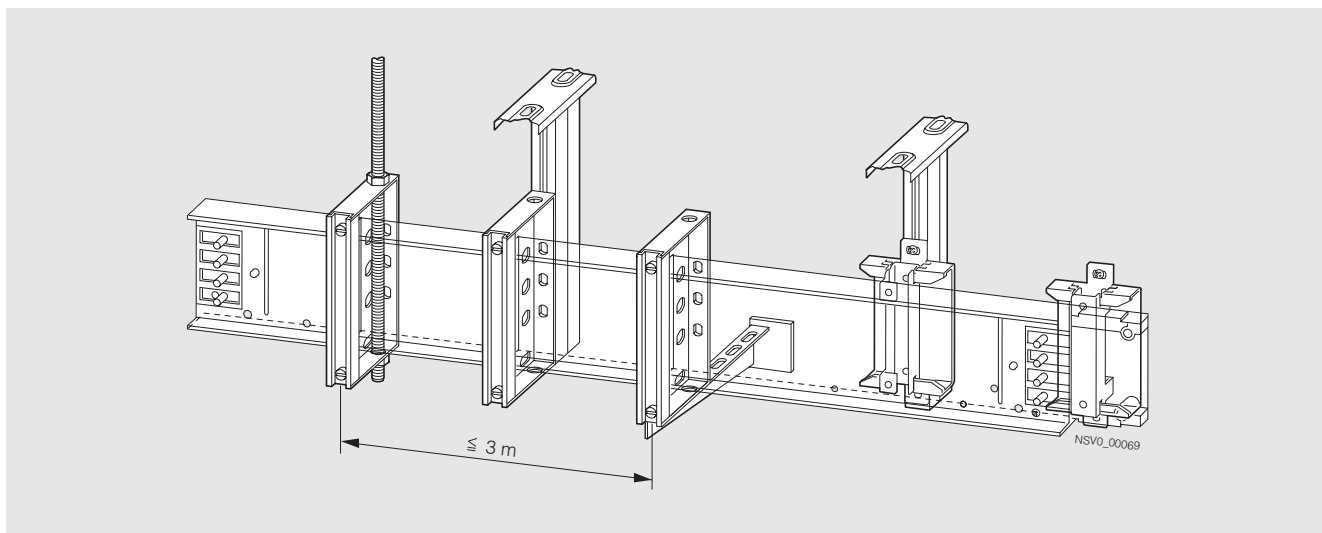
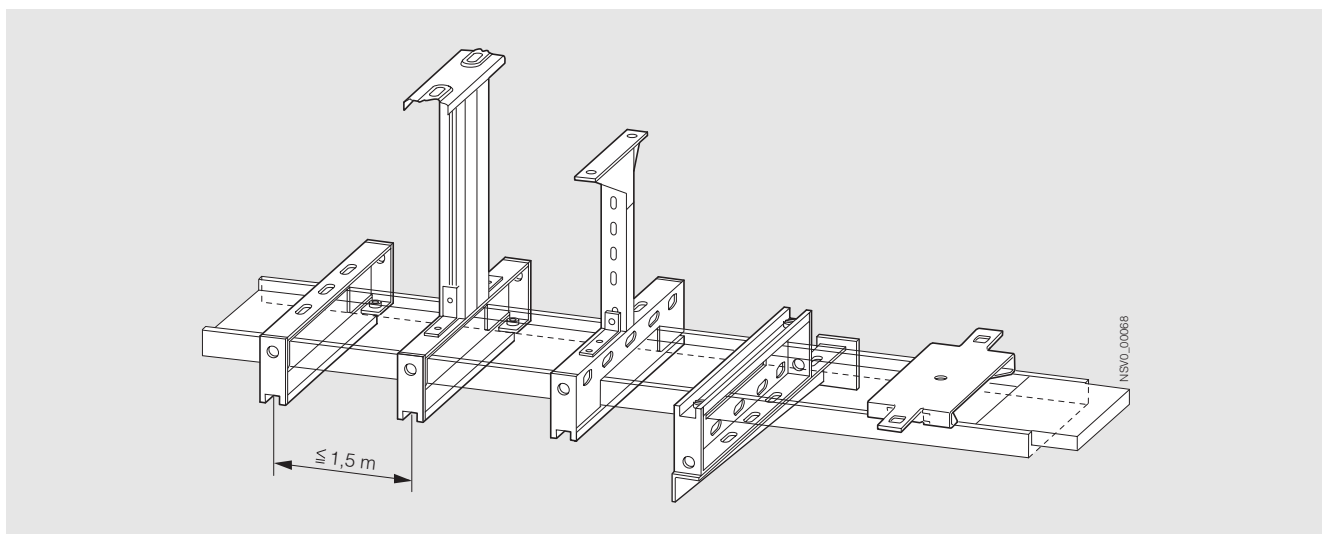


## Engineering information

### Pendent suspension using BD01-BAP (at connection point)



### Mounting examples with BD01-B and BD01-BA



## Function

### Required details

The following data must be considered when configuring the busbar runs:

- Installation flat or edgewise, horizontal or vertical, quantity, type and approximate ratings of prospective loads, p.f.
- Utilization and rated diversity factor = derating factor  $\alpha$ .
- If data are not available, use only the rated diversity factor
- Feeding transformers (short-circuit current)
- Nature of the installation site (dimensions, construction of the building, transport paths, cellar)
- Routing of supply lines from other power sources
- Crane operation
- Special requirements

### Operational current

The operational current is calculated using the following formula:

$$I_B = \frac{P_{\text{inst}} \times \alpha \times b}{\sqrt{3} \times U \times \cos \varphi} \times 10^3$$

with:

|                   |   |                           |                   |
|-------------------|---|---------------------------|-------------------|
| $I_B$             | = | Operational current       | (A)               |
| $P_{\text{inst}}$ | = | Installed power           | (kW)              |
| $\alpha$          | = | Derating factor           |                   |
| $b$               | = | Supply factor             |                   |
|                   |   | $b = 1$                   | = Single end feed |
|                   |   | $b = \frac{1}{2}$         | = Double end feed |
| $U_e$             | = | Rated operational voltage | (V)               |
| $\cos \varphi$    | = | Power factor              |                   |

If no data are available about the actual currents occurring simultaneously, the following values according to IEC/EN 60439-1 apply:

| Number of main circuits | Rated diversity factor $\alpha$ |
|-------------------------|---------------------------------|
| 2 and 3                 | 0.9                             |
| 4 and 5                 | 0.8                             |
| 6 to 9 inclusive        | 0.7                             |
| 10 or more              | 0.6                             |

### Short-circuit protection

A system can be protected against short circuit alone, by fitting low-voltage LV HRC fuse links (gL) into the incoming supply; the fuse size to be appropriate for the prospective short-circuit current at the point of installation.

### Overcurrent protection equipment for overload and short-circuit protection

Busbar trunking systems must be protected against overload and short circuits. Fuses and miniature circuit-breakers must be selected so that the admissible current carrying capacity corresponding with the ambient conditions is not exceeded.

Due to their high response threshold (1.3 to 1.6 times rated current) and their long rupturing times at small overcurrents, fuses are not suitable for overload protection. Therefore we recommend the use of motor-protective or standard circuit-breakers.

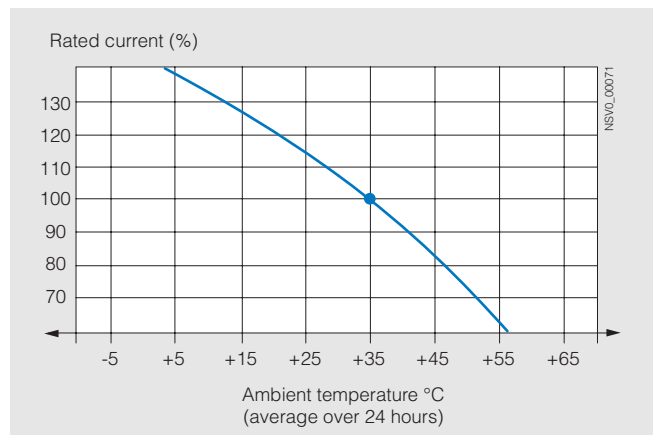
The following can be used:

| System   | Overcurrent protective devices |                          |
|----------|--------------------------------|--------------------------|
|          | $I_{cc} = 15 \text{ kA}^{1)}$  | $I_{cc} = 25 \text{ kA}$ |
| BD01-40  | 5SY4 340-6                     | 3VL27 05                 |
| BD01-63  | 5SY4 363-6                     | 3VL27 06                 |
| BD01-100 | –                              | 3VL27 10                 |
| BD01-125 | –                              | 3VL27 12                 |
| BD01-160 | –                              | 3VL27 16                 |

1)  $I_{cc}$  = Rated short-circuit current of the busbar trunking system and its outgoing circuits when protected by circuit-breakers

The prospective network short-circuit current and the let-through characteristic of the switches must be taken into account in each case.

### Temperature characteristic of BD01 systems

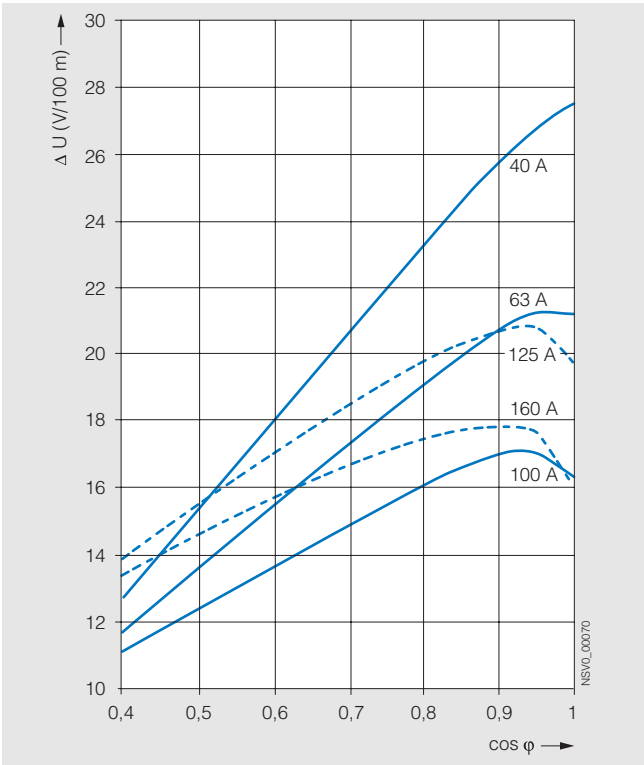


Engineering information

Voltage drop

Voltage drop at rated current

(Load distribution factor  $a = 1$ )



Calculation of the voltage drop

For long busbar runs, it may be necessary to calculate the voltage drop.

$$\Delta U = a \times \sqrt{3} \times I_B \times l \times (R \times \cos \varphi + X \times \sin \varphi) \times 10^{-3} \quad (\text{V})$$

with

- $\Delta U$  = Voltage drop (V)
- $I_B$  = Operational current (A)
- $l$  = Length (m)
- $a$  = Load distribution factor *see Table*
- $R$  = Ohmic resistance  $R_{20}$  (mΩ/m)
- $X$  = Inductive resistance  $X_{20}$  (mΩ/m)
- $\cos \varphi$  = Power factor

Factor  $a$  used in the equation for calculating the voltage drop is dependent on the load distribution.

| Load distribution                                                                  |                                        | Factor $a$ |
|------------------------------------------------------------------------------------|----------------------------------------|------------|
|   | Supply at A, one tap-off at B          | 1          |
|   | Supply at A, tap-offs at B, C, D, E    | 0.5        |
|   | Supply at A, tap-offs at B, C          | 0.25       |
|   | Supply at A, tap-offs at B, C, D, E    | 0.125      |
|  | Supply at A, B, tap-offs at C, D, E, F | 0.25       |