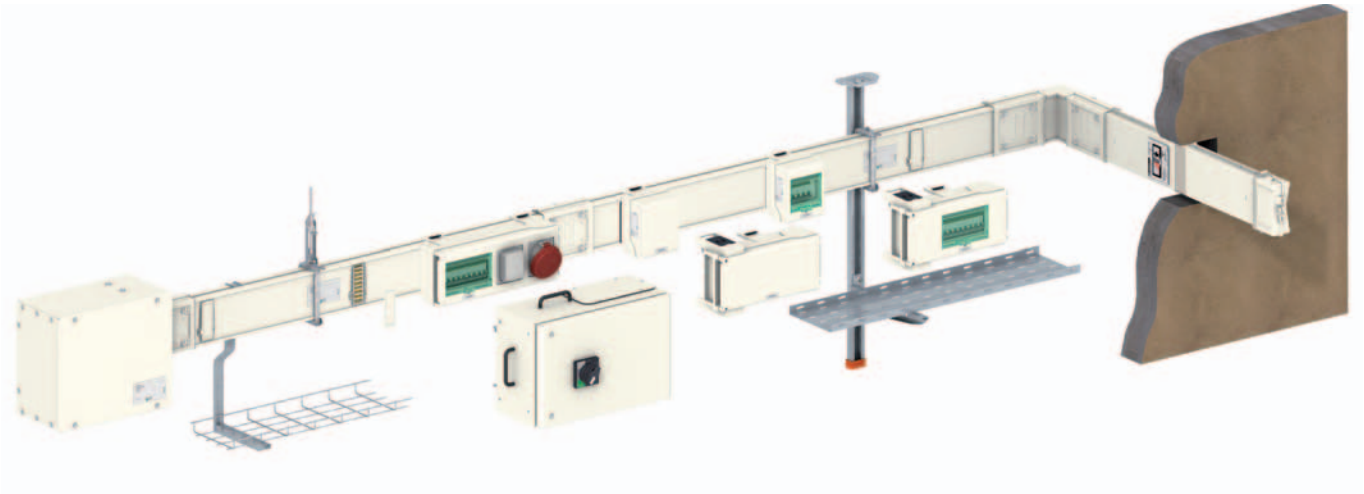
Low Voltage

Catalogue | 2014

# Canalis KSC 160 - 800 A

Busbar trunking systems
Copper



Schneider Electric

# General contents

# Index of commercial numbers

# Advantages of the

## Canalis...

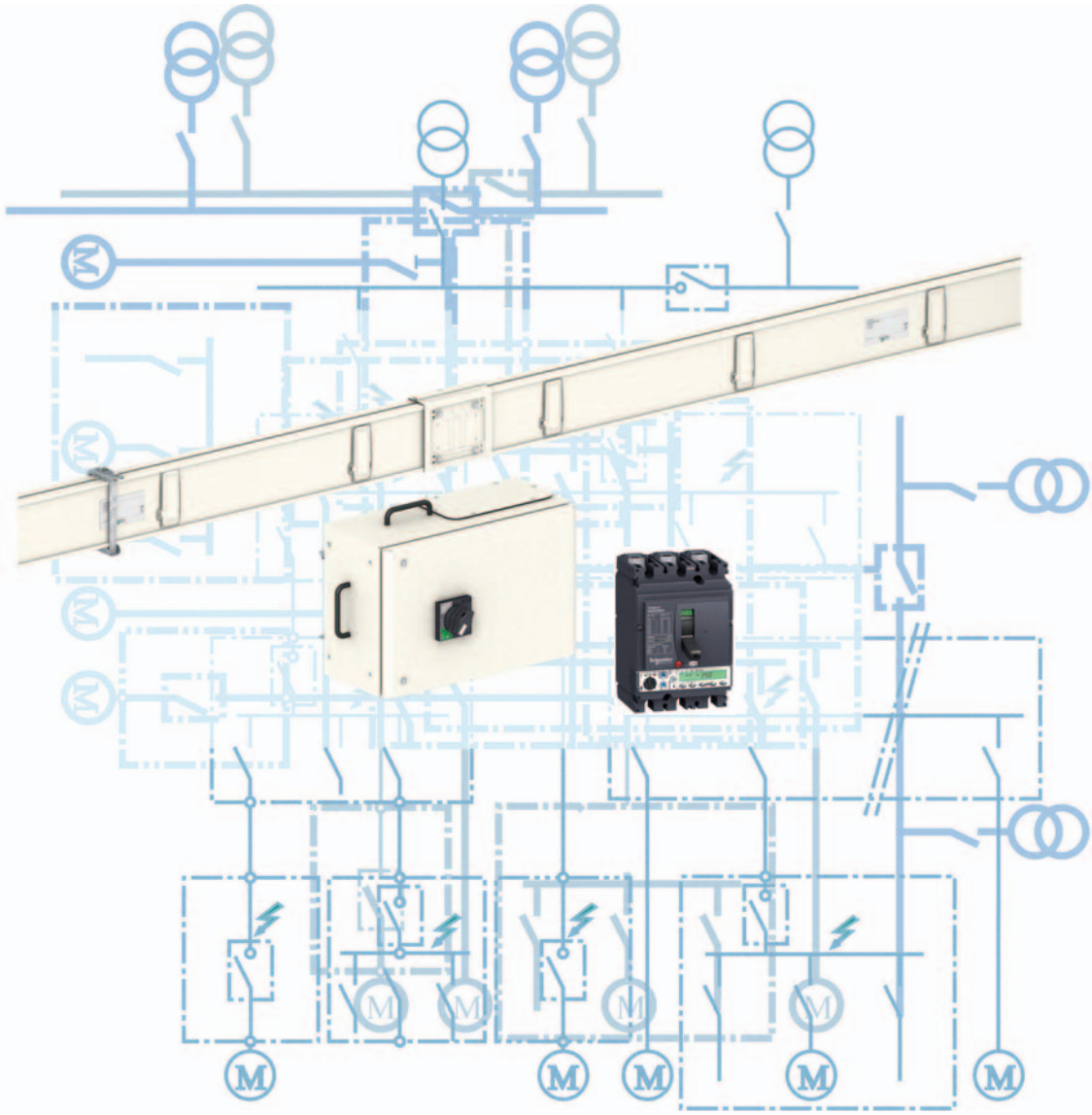
is part of a comprehensive offering of Schneider Electric products designed to operate together.
In particular, this offering covers all low and medium voltage electrical distribution components.

## Optimum system performance...

is ensured by coordination between the protection circuit breakers and the Canalis prefabricated busbar trunking used for decentralised distribution.

**Decentralised electrical distribution with total coordination perfectly satisfies all your requirements in terms of safety, continuity of service, upgradeability and simplicity.**

PD202357_r2.eps



At the end of the catalogue, we present the selection guide tables that ensure coordination between circuit breakers and Canalis busbar trunking.

# Schneider Electric system

PD202332_r2.eps

## Trunking protection

**Our circuit breakers offer:**

■ overload and short-circuit protection

■ coordination between protective devices and Canalis busbar trunking systems (BTS):
□ total discrimination:
- from 1 to 6300 A between all circuit breakers
□ cascading:
- reinforcement of low and medium-power BTS short-circuit protective devices to handle all possible short-circuit levels
- tap-off unit protection using standard circuit breakers regardless of where the tap-off unit is placed on the Canalis BTS

■ simplification of the design process, while ensuring a high degree of dependability

■ quick and easy fault tracking

■ simple reclosing (“resetting”) once the fault has been eliminated by the operator.

## Tap-off units

■ The Canalis tap-off units of the Schneider Electric system satisfy operator needs in terms of:
□ installation upgradeability without production downtime
□ continuity of service
□ safety.

■ The tap-off units:
□ can be connected and disconnected under energised conditions without risk to the operator
□ are designed for installation at one-meter intervals on the distribution BTS.

PD202333_r1.eps

PD202334_r1.eps

## Distribution switchboards

**Our protection switchgear optimises switchboard functions.**

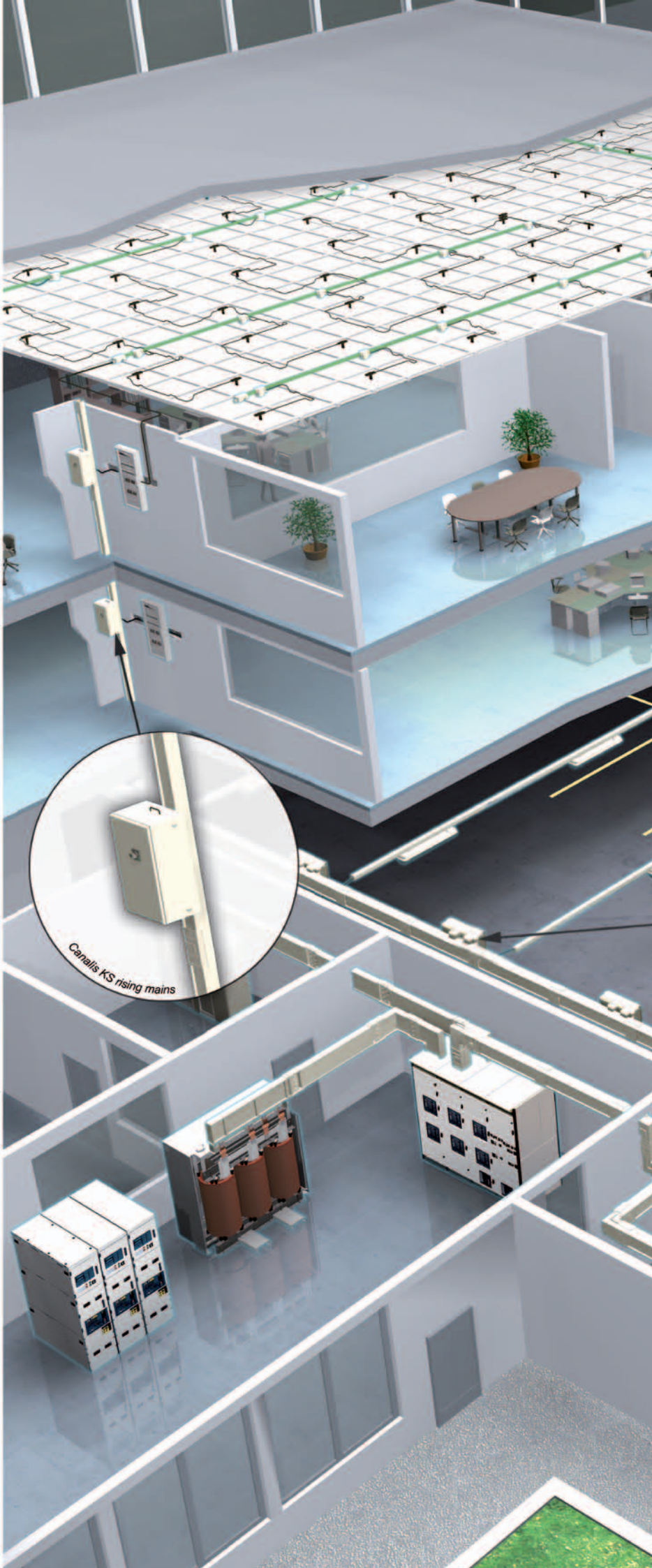
■ Schneider Electric guarantees upstream device coordination:
□ between Masterpact, Compact circuit breakers and between Compact and Acti 9 circuit breakers
□ between electrical distribution circuit breakers and industrial control circuit breakers (motor circuit breaker, Integral, etc.) for industrial control application.

■ Switch-disconnectors comply with the IEC 60947-3 standard and are designed to ensure AC23 load breaking and isolation.
Their protection is guaranteed by coordination with the upstream circuit breakers.

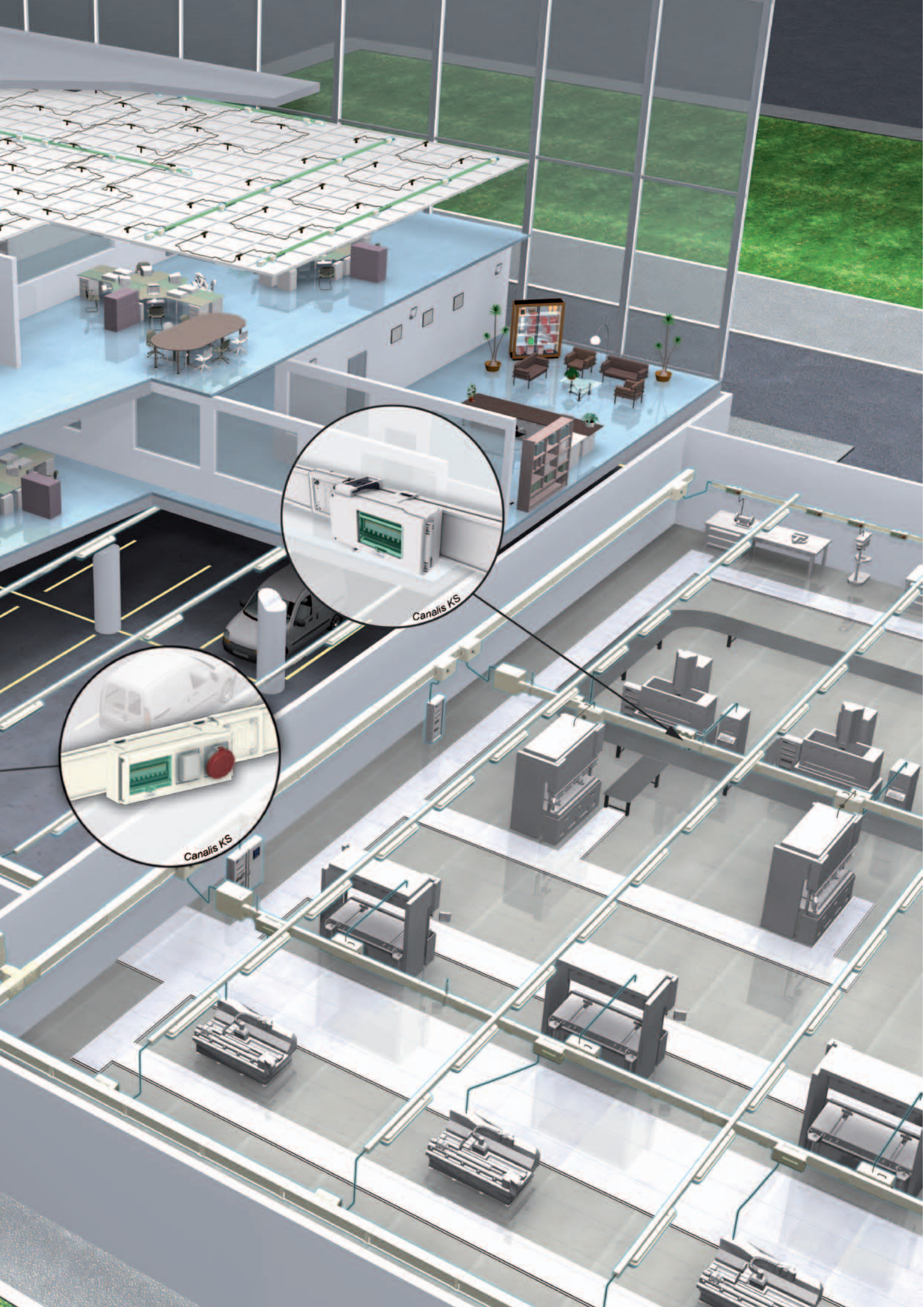
# Canalis®

Prefabricated busbar trunking
from 160 to 800 A

Electrical energy available
troughout your installation.




Schneider Electric


Canalis KS
Canalis KS

# Canalis KS means business !

As an electrical engineering specialist in service sector and industrial buildings, you want to offer optimal continuity of service and safety for your customers while controlling your costs and deadlines.
Canalis KS is a range of prefabricated busbar trunking and tap-off units specially designed for you and your customers.

57284363_r.eps

dv1576116.eps

71427827_7_r.eps

## Schneider Electric know-how at your disposal

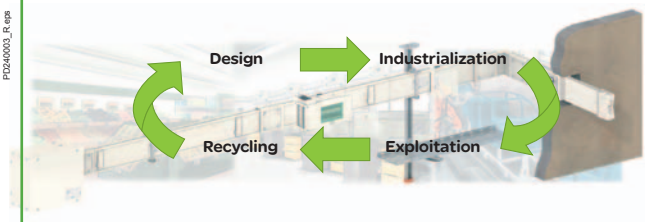
With Canalis KS, you obtain all the modularity, engineering design and innovation developed by the world leader in electricity distribution.
This range of busbar trunking comprises:

> a large choice of ratings
> customized elements adapted to your installation constraints
> protection devices to ensure continuity of service and the safety of personnel and equipment.

## An environmentally friendly life cycle

The manufacturing, packing and distribution processes have been designed to limit the environmental impact of our products.
In service, KS busbar trunking dissipates less than 0.1 % of the total power circulating in the product.
At end of life, over 90 % of the materials used can be recycled by crushing or dismantling.

PD240003_R.eps




> For more information, the environmental profile of the Canalis KS range is available on www.schneider-electric.com.

## Safety of personnel and of electrical equipment above all

With Canalis KS, you have a reliable electrical system, because the prefabricated busbar trunking has been optimized and tested in accordance with the IEC 61439-2 standard.

The whole Canalis KS range contains neither halogen nor PVC. This means that in the event of a fire, the busbar trunking will release no fumes or toxic gases.
The fire-break elements confine the fire for two hours, in vertical and horizontal positions.

Rugged and safe, the Canalis KS range offers you a high degree of protection:

> IP55 (on edge or flat)
> IK08
> IPxxD
> sprinkler test.

DD202131_r.eps


DD202143_r.eps


DD202144_r.eps


DD202130_r.eps

# Our performance... your values

## Excellent contact
Tap-off unit contacts are silver-plated and made with copper ETP 99.9 % purity. The level of performance remains the same throughout the life of the product.

## Incomparable scalability
The electrical busbar trunking has a high density of tap-off points even in rising mains, due to the absorption of differential expansion by the junctions.
The tap-off units are removable and can be handled live.

## Easy handling and installation
Because the available space in technical ducts is limited, Canalis KS gives the advantage to use significantly less room compared to a centralised distribution system using cables.
Installation is made easy due to the design of the jointing units that facilitate alignment of the straight lengths.

## Maintenance free
All sliding jointing contacts are lubricated for the life of the product.

## Very flexible
The floor-distribution components in the Canalis KS range offer 3 or 4 tap-off outlets per floor, enough to have reserve outlets for future upgrades.

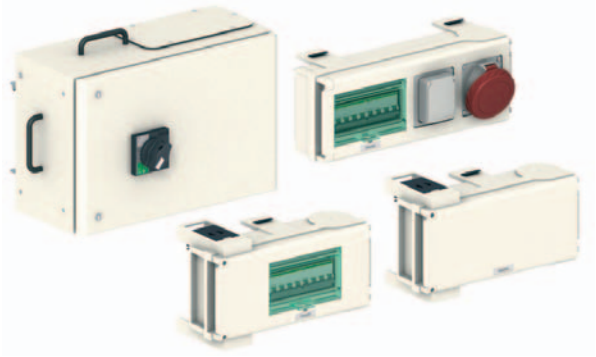
## Protected feed units
These provide line protection.
They make it possible to perform operations on a line by de-energizing it, without interrupting the power supply of the whole system.

## A complete range of tap-off units
> The range covers all needs from 25 to 400 A.
> Protection is possible using circuit breakers, fuses or surge arresters.
> Also available are 32 A tap-off units equipped with household and industrial power sockets.

## Intelligent tap-off units
> They monitor the installation to avoid overloads and ensure continuity of service.
> They can meter the energy consumed for precise management (cost allocation for each consumer).

PD2202192_r1.eps

PD2202207_r1.eps



# Also available in Canalis range...

## Lighting distribution

| Range | Canalis KDP |
|---|---|

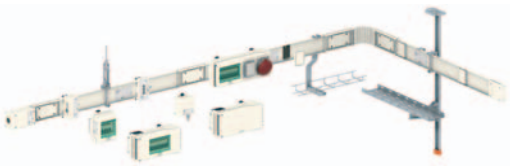
PD202216_r.eps

| Run components | |
|---|---|
| **Degree of protection** | IP55 |
| **Number of circuits** | 1 |
| **Rating** | 20 A |
| **Tap-off intervals** | 1200 - 1350 - 1500 - 2400 - 2700 - 3000 mm |
| **Standard lengths** | 24 and 192 meters |
| **Finish** | - |
| **Maximum distance between fixing points** | 0.7 meter |
| **Material** | Copper |

## Power distribution

| Range | Canalis KNA |
|---|---|

PD202221_r.eps



| Run components | |
|---|---|
| **Degree of protection** | IP55 |
| **Polarity** | 3L + N + PE |
| **Rating** | 40, 63, 100 and 160 A |
| **Tap-off intervals** | 500 - 1000 - 1500 mm |
| **Standard lengths** | 3 meters |
| **Finish** | White RAL 9001 |
| **Maximum distance between fixing points** | 3 meters |
| **Material** | Aluminium |

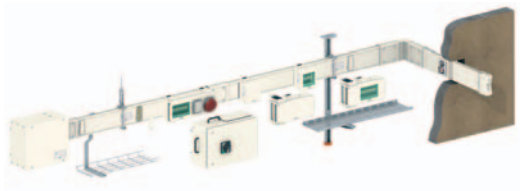
## Canalis KBA / KBB

PD202217_r2.eps

| |
|---|
| IP55 |
| 1 |
| 27 and 42 A |
| 500 - 1000 - 1500 mm |
| 2 and 3 meters |
| White RAL 9003 |
| 3 meters |
| Copper |

## Canalis KSA

PD202222_r.eps



| |
|---|
| IP55 |
| 3L + N + PE |
| 100, 160, 250, 400, 500, 630, 800 and 1000 A |
| 500/1000 mm on each face |
| 3 and 5 meters |
| White RAL 9001 |
| 3 and 5 meters |
| Aluminium |

## Canalis KTA / KTC

PD202343.eps

| |
|---|
| IP55 |
| 3L + PE ; 3L + N +PE ; 3L + N + oversized PE |
| 800, 1000, 1250, 1350, 1600, 2000, 2500, 3200, 4000 and 5000 A |
| 500 and 1000 mm |
| 2 and 4 meters |
| White RAL 9001 |
| 3 meters |
| Aluminium (KTA) or copper (KTC) |

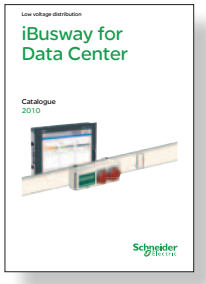
# Canalis tools

## Technical datasheets

- In exhibition center: KD0C00CTAFEEN
- In electronics factories: KD0C00CTAUEEN
- In tiles factories: DEBU005EN
- In automobile industry: KD0C98CTAAUEN
- Reduce electromagnetic emissions: DESWED113001EN


## Solution for Data Center

- iBusway for Data Center catalogue: DEBU028EN
- iBusway for Data Center brochure: DEBU027EN





## Solution for lighting management

- iBusway for lighting management: Canalis-DALI technical installation guide, DEBU032EN
- Brochure iBusway for lighting management: DESWED112002EN



## Application datasheets / Guide

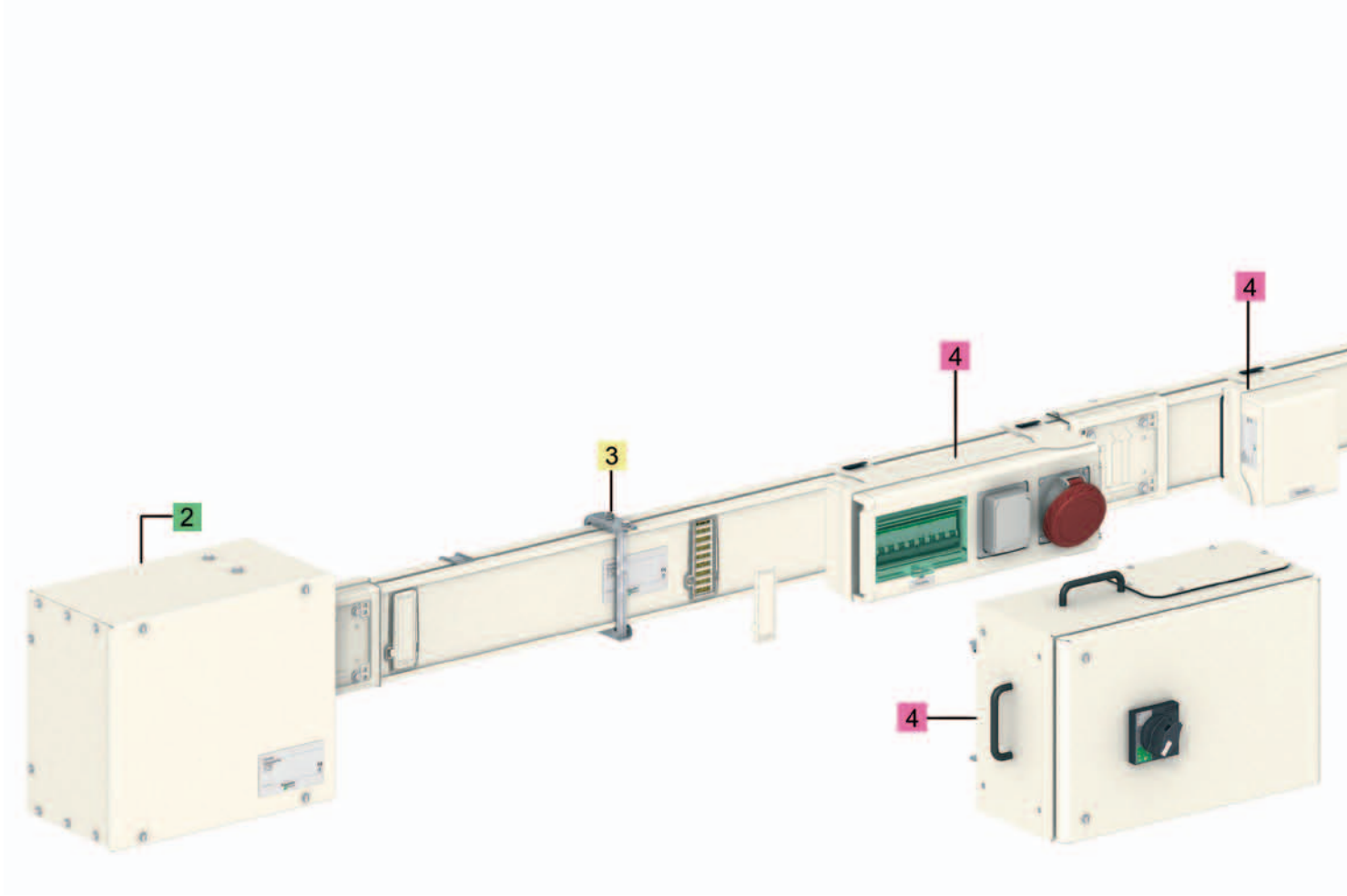
- In cruise ships: DESWED105014EN
- In livestock production buildings: DESWED105010EN
- In logistic centers: DESWED105011EN
- In car parks: DESWED108011EN
- In greenhouses: DESWED105013EN
- In garages: DESWED106004EN
- In hypermarkets: KD0C98CTAHYEN


# Contents

# Canalis KSC

## For medium-power distribution from 160 to 800 A

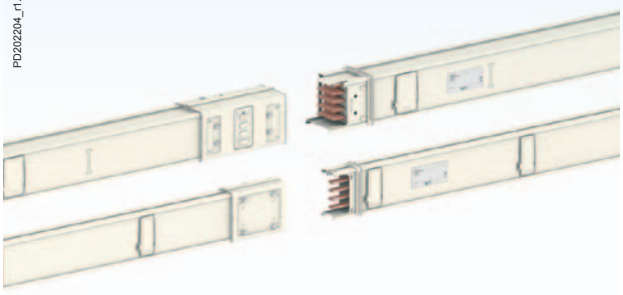
PD202208_r.eps




## 1. Run components

- Rating: 160, 250, 400, 630, 800 A.
- 4 live conductors.
- Length of basic components: 3 metres.

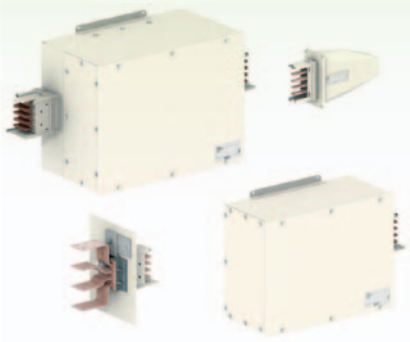
PD202204_r1.eps

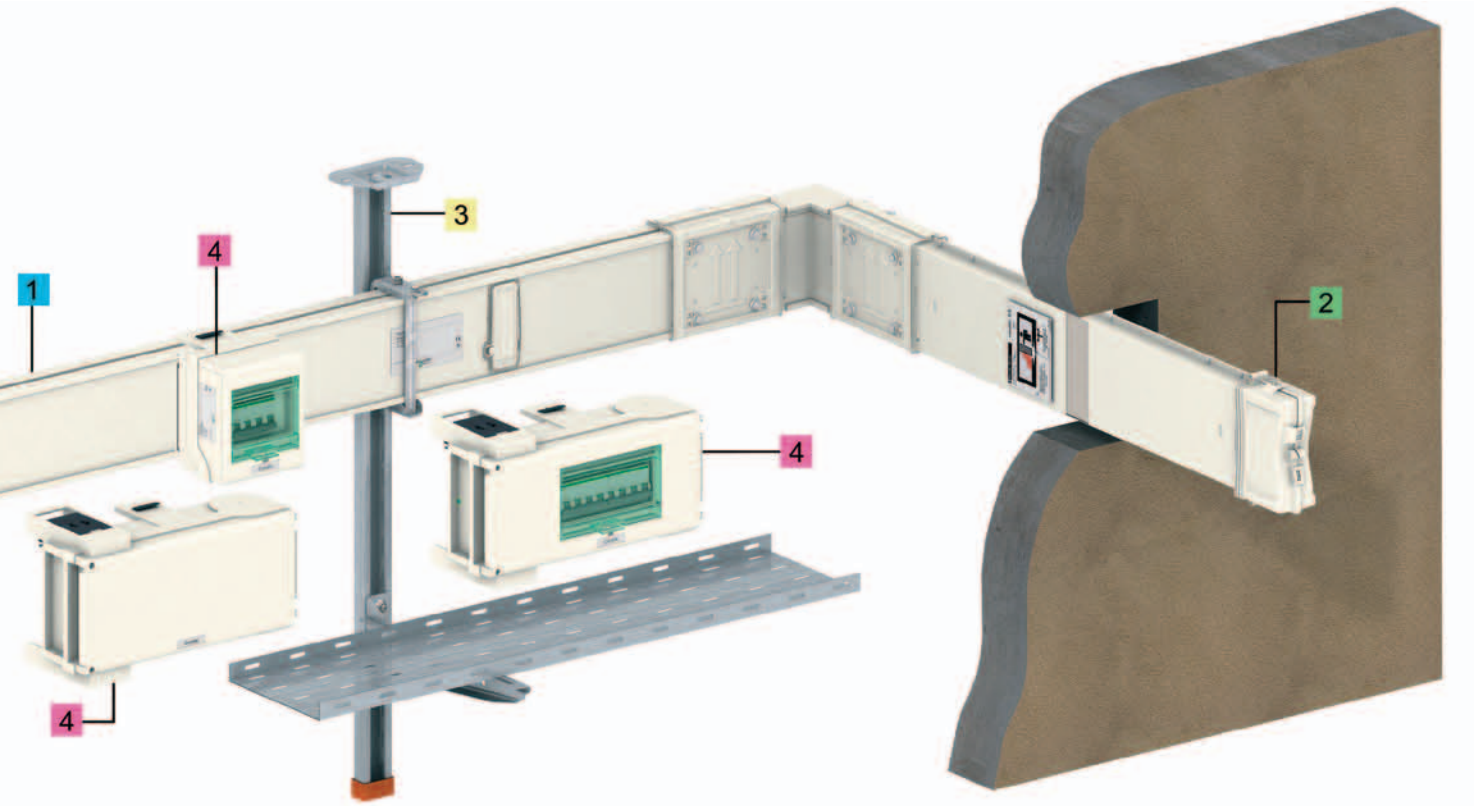


## 2. Feed units and end covers

- The feed units delivered with end covers, receive the cables supplying one end or any other point of Canalis KSC trunking.

PD202205_r1.eps






## 3. Fixing system

■ The fixing system ensures that Canalis KSC is well secured, whatever the type of building structure.

DB403671.eps

## 4. Tap-off units

■ The tap-off units (with and without isolators) are used to:
□ supply loads from 25 to 400 A
□ or protect nearby loads against overloads due to lightning strikes.
■ Protection is ensured with modular or Compact NSX circuit breakers or fuses.

PD202207_r.eps

# Canalis KSC
## for medium-power distribution from 160 to 800 A

## No toxic emission in case of fire

All components in the KS range are **halogen free**.
In case of fire, Canalis KS does not release smoke or toxic gases.

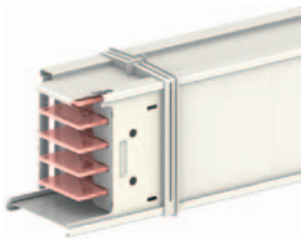
DD202141_r.eps

PD202209_r1.eps

## Material quality

Contacts are copper ETP 99.9 % purity.
The level of performance remains the same throughout the life of the product.

PB108181.eps



## A high degree of protection

The high degree of protection for Canalis KS means it can be installed in all types of buildings.

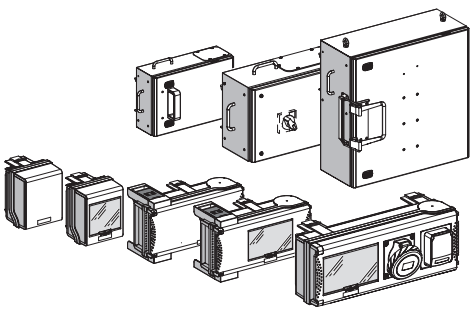
- **IP55** guarantees trunking protection against splashes, and dust.
- **IK08** guarantees the strength of the trunking (resistance to shocks).
- **IPxxD** ensures totally safe working conditions for maintenance personnel.
- Canalis KS complies with **sprinkler tests**, guaranteeing operation under vertically and horizontally sprayed water for 50 minutes.

DD202142_r.eps


DD202143_r_1.eps


DD202144_r_1.eps


DD202176.eps



## A complete range of tap-off units

- The range covers all needs from 25 to 400 A.
- Protection is possible using circuit breakers, fuses or surge arresters.
- Also available are 32 A tap-off units equipped with household and industrial power sockets.

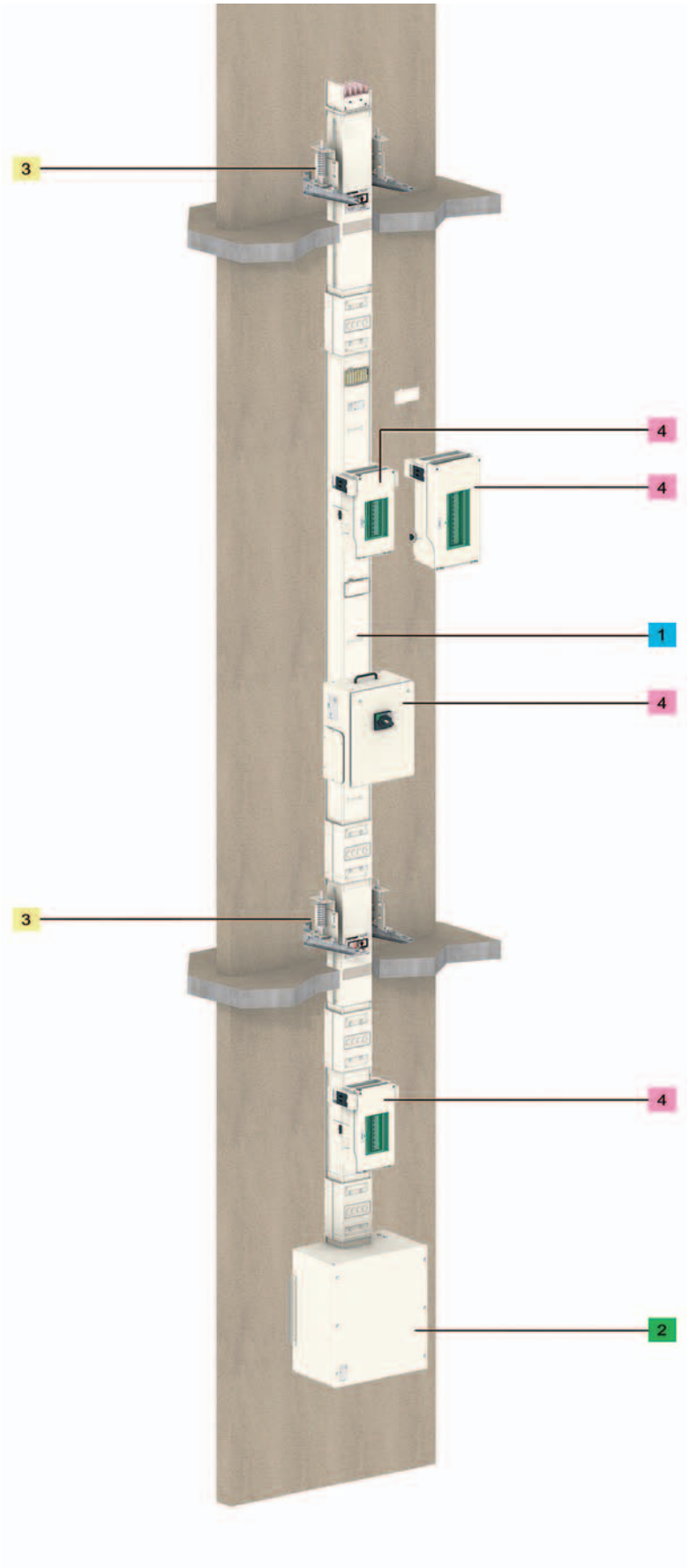
## Intelligent tap-off units

- They monitor the installation to avoid overloads and ensure continuity of service.
- They can meter the energy consumed for precise management (cost allocation for each consumer).

# Canalis KSC rising mains

## Medium-power busbar trunking for multi-storey building from 160 to 800 A

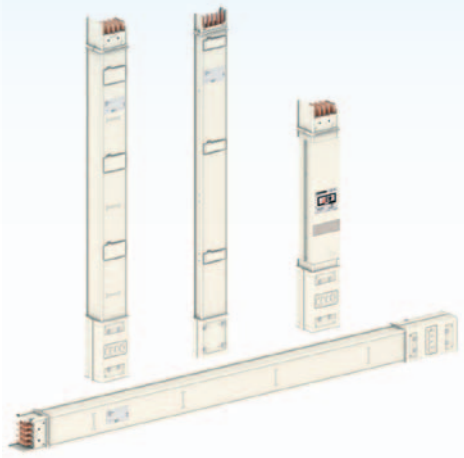
PD2022210_r1.eps



## 1. Run components

- Rating: 160, 250, 400, 630, 800 A.
- 4 live conductors.
- 2 types of riser components for:
  - power-distribution between floors
  - horizontal sections.

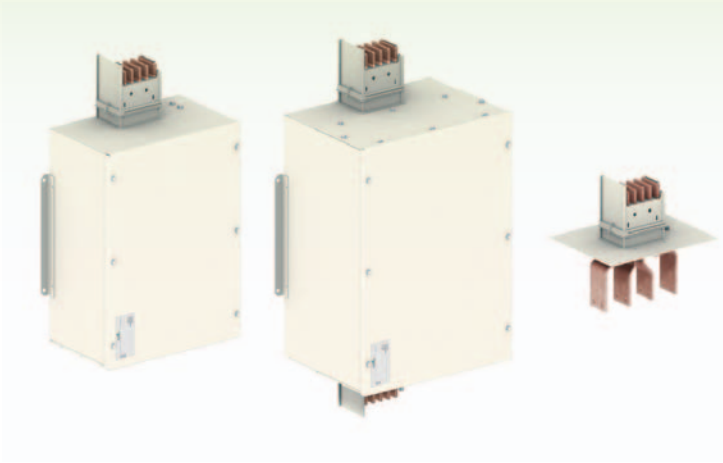
PD202211_r1.eps



## 2. Feed units and end covers

- The feed units delivered with end covers, receive the cables supplying one end or any other point of Canalis KSC trunking

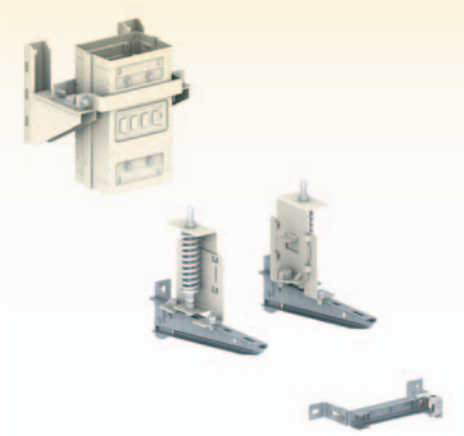
PD202212_r1.eps



## 3. Fixing system

- The fixing system is made up of
  - bottom support
  - floor guide
  - floor supports for the riser.

PD202213.eps



## 4. Tap-off units

- The tap-off units (with and without isolators) are used to supply loads from 25 to 400 A.
- Protection using modular or Compact NSX circuit breakers or fuses.

PD202214_r.eps

# Canalis KSC rising mains

## Medium-power busbar trunking for multi-storey building from 160 to 800 A

PD2022215_r1.eps

DD2022210_r.eps


## Dependable and reliable

Canalis KS benefits from a number of marine certifications, including Bureau Veritas (BV), Lloyd's (GL) and Norske Veritas (DNV).

## No risk in case of fire

All components in the KS range are **halogen free** and contain no PVCs. In case of fire, Canalis KS releases very small quantities of smoke and no toxic gases. Due to the two-hour fire barrier, **flames cannot spread**. The trunking thus contributes to containing the fire for two hours.

## A high degree of protection

Canalis KS offers an IP55 degree of protection.
Thus, it can be installed in all types of buildings and in all positions.
**Even installed vertically**, it retains the IP55 degree of protection without requiring any accessories.

PD2022233.eps

## Unmatched upgrading possibilities

Canalis KS makes it fast and easy to upgrade the installation. The tap-off units can be removed and handled under energised conditions.
What is more, a line **does not require expansion joints** since the expansion of straight lengths is absorbed automatically by the electrical junctions. This technique ensures that the tap-off outlets on all floors remain available.

## Easy handling and installation

Floor-distribution components are designed to facilitate:
- **access to the straight lengths on floors** given the narrowness of lift shafts and stairways,
- **installation of the straight lengths** given the height of doors and the size of shafts and technical ducts.

Because the available space in technical ducts is limited, Canalis KS gives the advantage to use **significantly less room** compared to a centralised distribution system using cables.

Installation is made easy due to the design of the **jointing units that facilitate alignment** of the straight lengths.

PD2022212_r1.eps

## Maintenance free

Canalis KS enhances the continuity of service because **no maintenance is required on the line**. All sliding jointing contacts are lubricated for the life of the product.

DD2022146_r.eps

## Very flexible

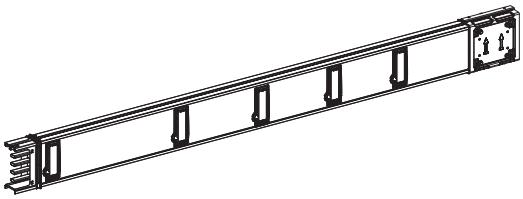
The floor-distribution components in the Canalis KS range offer **3 or 4 tap-off outlets per floor**, enough to have reserve outlets for future upgrades.

# Straight components

## Straight lengths 3L + N + PE or 3L + PE

### Straight lengths with tap-off outlets

DD230597.eps

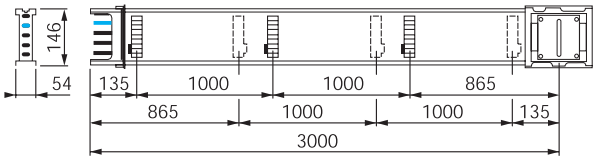


KSC160ED4306

| Rating (A) | Length (mm) | Number of outlets | Cat. no. |
|---|---|---|---|
| 160 | 3000 | 6 | KSC160ED4306 |
| | | 12 | KSC160ED43012 |
| 250 | 3000 | 6 | KSC250ED4306 |
| | | 12 | KSC250ED43012 |
| 400 | 3000 | 6 | KSC400ED4306 |
| | | 12 | KSC400ED43012 |
| 630 | 3000 | 6 | KSC630ED4306 |
| | | 10 | KSC630ED43010 |
| 800 | 3000 | 6 | KSC800ED4306 |
| | | 10 | KSC800ED43010 |

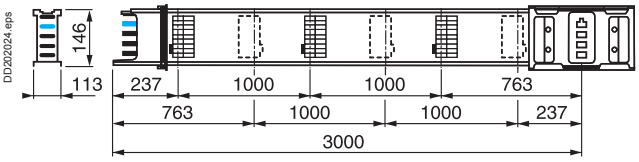
**KSC●●●ED4306 from 160 to 400 A**

DD210291.eps



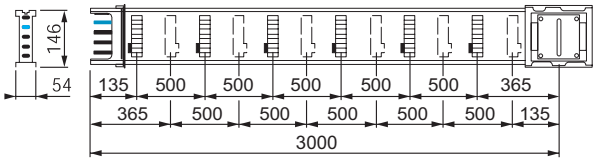

**KSC●●●ED4306 from 500 to 800 A**

DD202024.eps



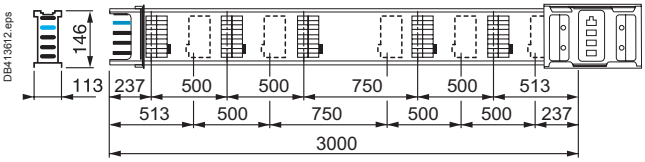

**KSC●●●ED43012 from 160 to 400 A**

DD230169.eps




**KSC●●●ED43010**

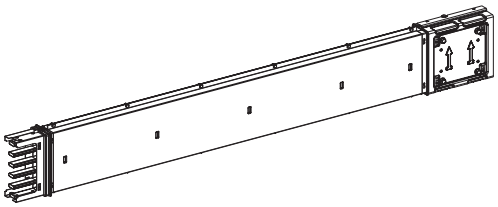
DB413612.eps




## Straight lengths 3L + N + PE or 3L + PE

### Straight lengths without tap-off outlet

DD230585.eps

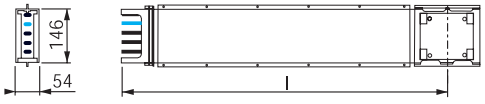


KSC●●●ET4A

| Rating (A) | Length (mm) | Cat. no. |
|---|---|---|
| 250 | 500 to 2000 | KSC250ET4A |
| 400 | 500 to 2000 | KSC400ET4A |
| 630 | 500 to 2000 | KSC630ET4A |
| 800 | 500 to 2000 | KSC800ET4A |

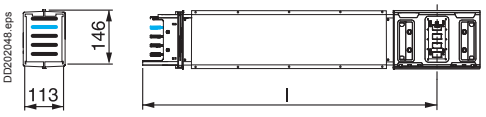
**KSC●●●ET4A from 250 to 400 A**

DD230600.eps




**KSC●●●ET4A from 630 to 800 A**

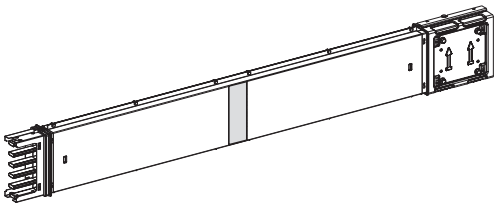
DD202048.eps




| Dimension "l" | 500 to 2000 mm |
|---|---|

### Straight lengths without tap-off outlet with fire barrier

DD230584.eps

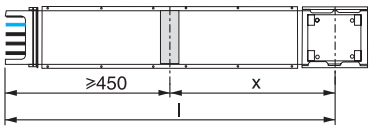


KSC250ET4AF

| Rating (A) | Length (mm) | Cat. no. |
|---|---|---|
| 250 | 500 to 2000 | KSC250ET4AF |
| 400 | 500 to 2000 | KSC400ET4AF |
| 630 | 500 to 2000 | KSC630ET4AF |
| 800 | 500 to 2000 | KSC800ET4AF |

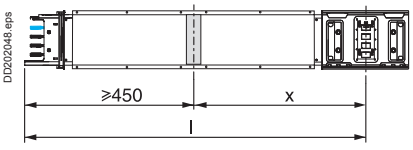
**KSC●●●ET4AF from 250 to 400 A**

DD230601.eps




**KSC●●●ET4AF from 630 to 800 A**

DD202048.eps



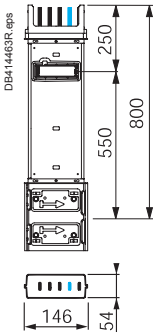

| Rating (A) | Dimensions (mm) | |
|---|---|---|
| | l | x |
| 250 to 400 | 900 to 2190 | 900 to 1740 |
| 630 to 800 | 900 to 2340 | 900 to 1890 |

## Straight lengths 3L + N + PE or 3L + PE

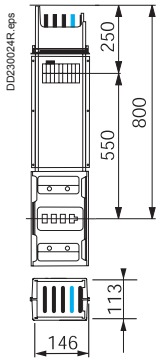
### Rising mains

| Rating (A) | Length (mm) | Number of outlets | Cat. no. |
|---|---|---|---|
| 250 | 800 | 1 | **KSC250ED4081** |
| | 2000 | 3 | **KSC250EV4203** |
| | 2500 | 4 | **KSC250EV4254** |
| 400 | 800 | 1 | **KSC400ED4081** |
| | 2000 | 3 | **KSC400EV4203** |
| | 2500 | 4 | **KSC400EV4254** |
| 630 | 800 | 1 | **KSC630ED4081** |
| | 2000 | 3 | **KSC630EV4203** |
| | 2500 | 4 | **KSC630EV4254** |
| 800 | 800 | 1 | **KSC800ED4081** |
| | 2000 | 3 | **KSC800EV4203** |
| | 2500 | 4 | **KSC800EV4254** |

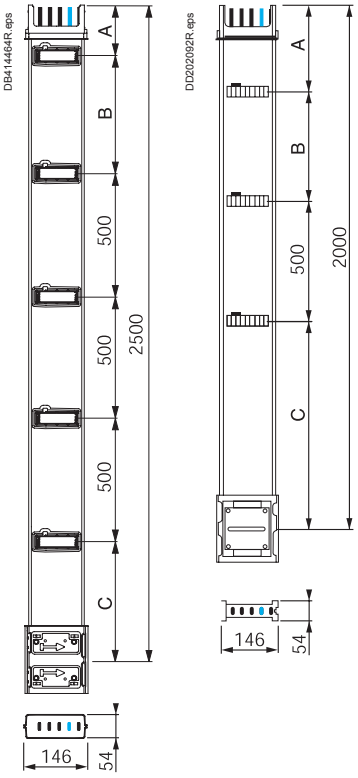
**KSC●●●ED4081 from 250 to 400 A**



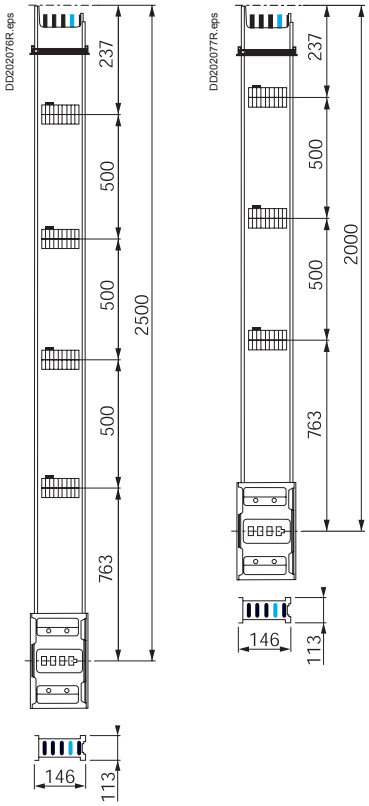

**KSC●●●ED4081 from 630 to 800 A**




**KSC●●●EV42●● from 250 to 400 A**



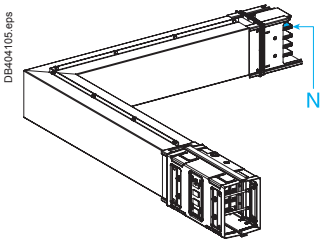

**KSC●●●EV42●● from 630 to 800 A**




| Dimensions | 250 A | 400 A |
|---|---|---|
| A | 135 | 150 |
| B | 500 | 485 |
| C | 865 | 865 |

# Straight components

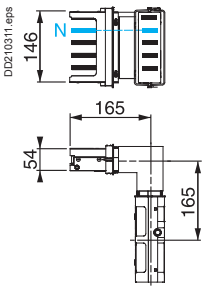
## Elbows 3L + N + PE or 3L + PE



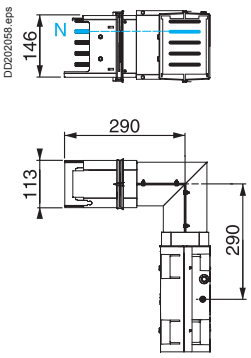

KSC●●●DLC4A

| Rating (A) | Direction (edgewise) | Cat. no. |
|---|---|---|
| 250 | Left or right | KSC250DLC40 |
| | Upwards | KSC250DLE40 |
| | Downwards | KSC250DLF40 |
| 400 | Left or right | KSC400DLC40 |
| | Upwards | KSC400DLE40 |
| | Downwards | KSC400DLF40 |
| | Left or right | KSC400DLC4A |
| | Upwards | KSC400DLE4A |
| | Downwards | KSC400DLF4A |
| 800 | Left or right | KSC800DLC40 |
| | Upwards | KSC800DLE40 |
| | Downwards | KSC800DLF40 |
| | Left or right | KSC800DLC4A |
| | Upwards | KSC800DLE4A |
| | Downwards | KSC800DLF4A |

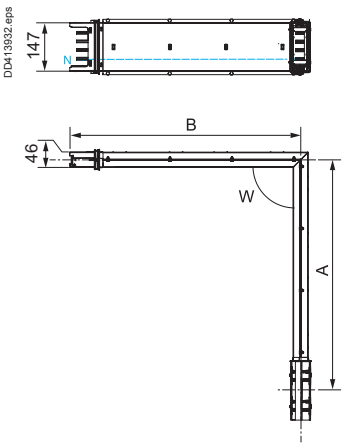
**KSC●●●DLC40**
**From 250 to 400 A**



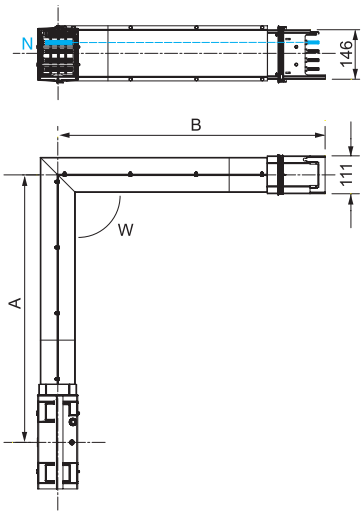

**For 800 A**



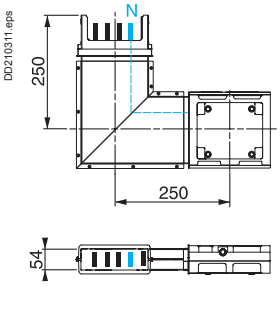

**KSC●●●DLC4A**
**For 400 A**



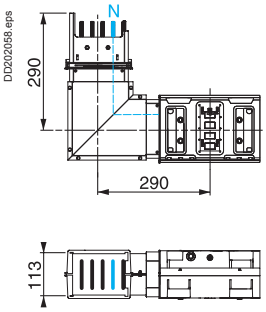

**For 800 A**



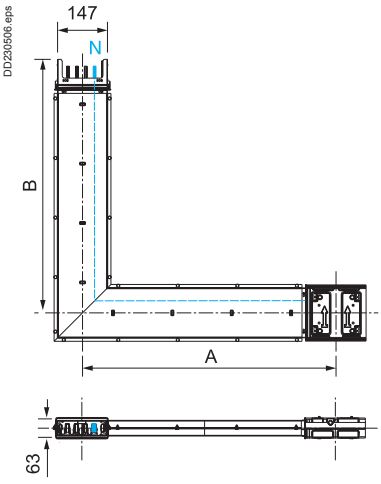

**KSC●●●DLE40**
**From 250 to 400 A**



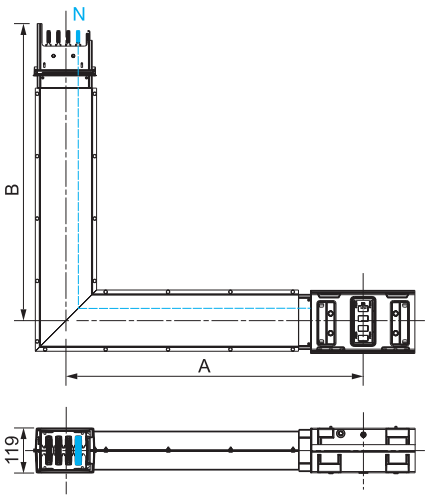

**For 800 A**



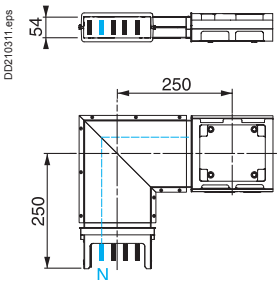

**KSC●●●DLE4A or KSC●●●DLF4A**
**For 400 A**



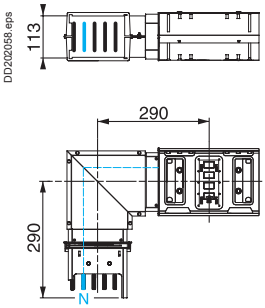

**For 800 A**




**KSC●●●DLF40**
**From 250 to 400 A**

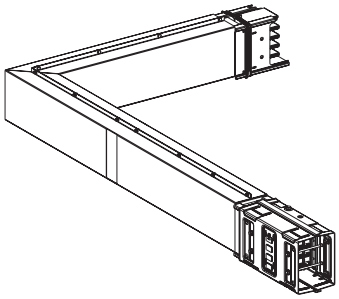



**For 800 A**




| Rating (A) | Direction (edgewise) | Dimensions (mm) | |
|---|---|---|---|
| | | A | B |
| 400 | Right or left | 200 to 695 | 200 to 695 |
| | Upward or downward | 250 to 745 | 250 to 745 |
| 800 | Right or left | 290 to 785 | 290 to 785 |
| | Upward or downward | 290 to 785 | 290 to 785 |

## Made-to-measure elbows with fire barrier 3L + N + PE or 3L + PE



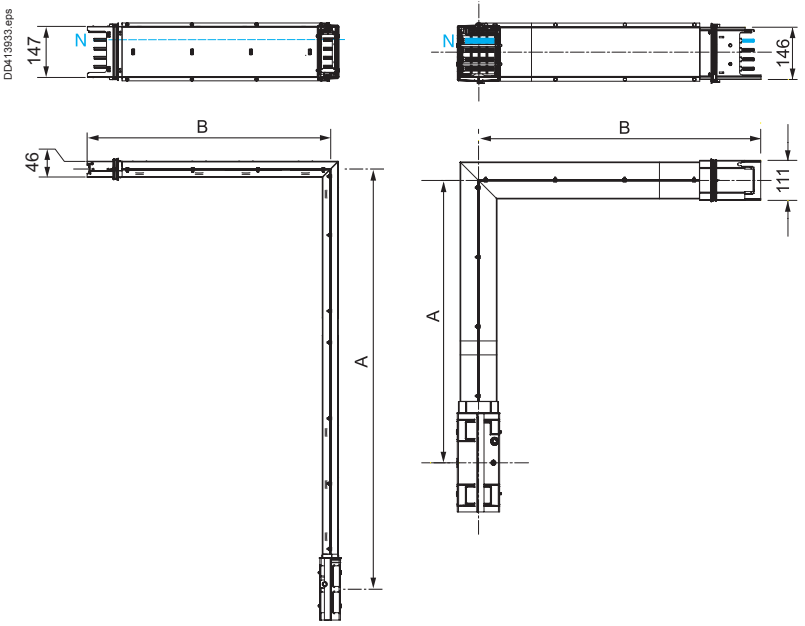

**KSC●●●DLC4CF**

| Rating (A) | Direction (edgewise) | Cat. no. |
|---|---|---|
| 250 | Left or right | **KSC250DLC4CF** |
| | Upwards | **KSC250DLE4CF** |
| | Downwards | **KSC250DLF4CF** |
| 400 | Left or right | **KSC400DLC4CF** |
| | Upwards | **KSC400DLE4CF** |
| | Downwards | **KSC400DLF4CF** |
| 800 | Left or right | **KSC800DLC4CF** |
| | Upwards | **KSC800DLE4CF** |
| | Downwards | **KSC800DLF4CF** |

**KSC●●●DLC4CF**

**From 250 to 400 A**

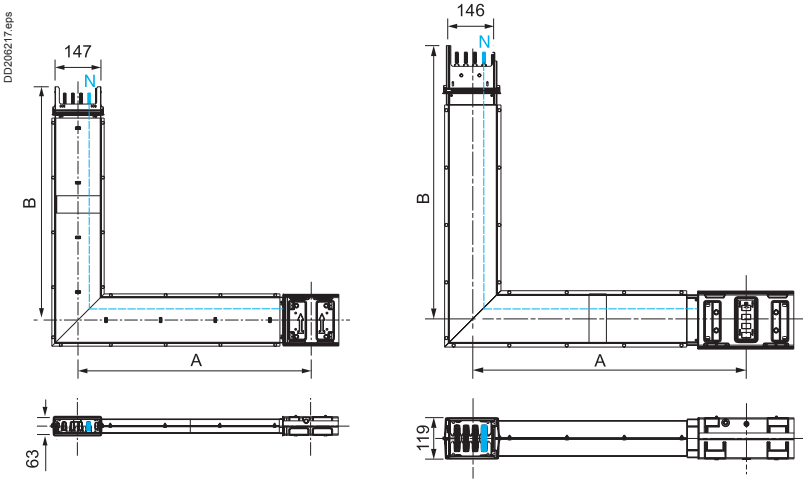
**For 800 A**




**KSC●●●DLE4CF or KSC●●●DLF4CF**

**From 250 to 400 A**

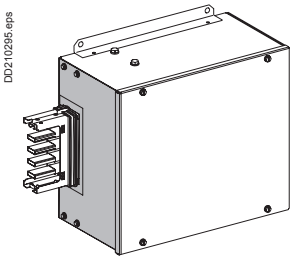
**For 800 A**




| Rating (A) | Direction (edgewise) | Dimensions (mm) | |
|---|---|---|---|
| | | cote A | cote B |
| 250 to 400 | Right or left | 200 to 695 | 200 to 695 |
| | Upward or downward | 250 to 745 | 250 to 745 |
| 800 | Right or left | 290 to 785 | 290 to 785 |
| | Upward or downward | 290 to 785 | 290 to 785 |

# Feed units

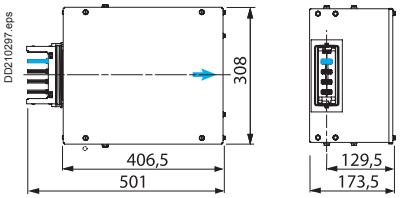
## Feed units



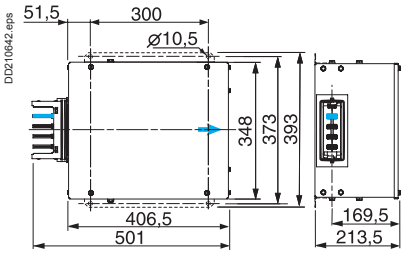

KSC250AB4

| Rating (A) | Direction (edgewise) | Cat. no. |
|---|---|---|
| 250 | Left or right | **KSC250AB4** |
| 400 | Left or right | **KSC400AB4** |
| | Central | **KSC400ABT4** |
| 800 | Right | **KSC800ABD4** |
| | Left | **KSC800ABG4** |
| | Central | **KSC800ABT4** |

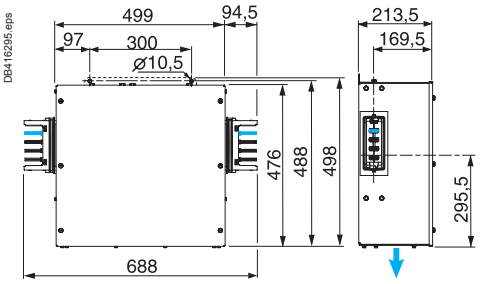
**KSC250AB4**



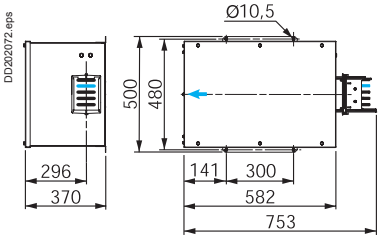

**KSC400AB4**



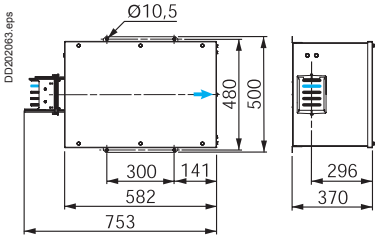

**KSC400ABT4**



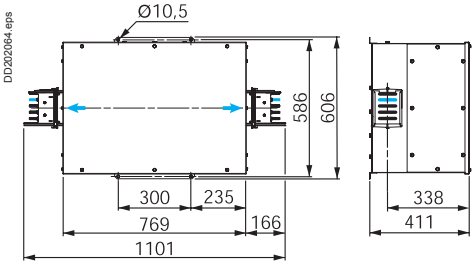

**KSC800ABG4**




**KSC800ABD4**

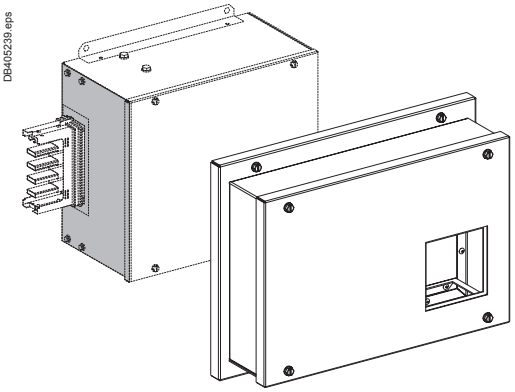



**KSC800ABT4**




➔ *Cable exit.*

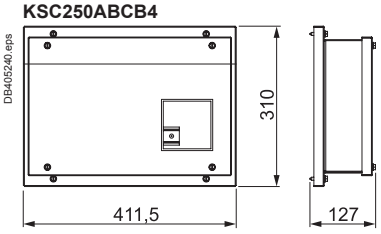
## Communication box for KSC feeder



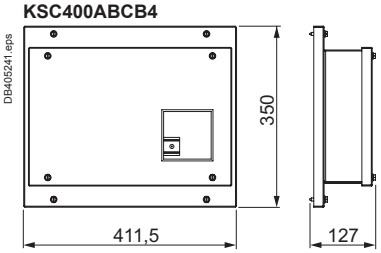

**KSC●●●ABCB4**

| Rating (A) | Designation | Cat. no. | Weight (kg) |
|---|---|---|---|
| 250 | Communication box for KSC feeder 250 A | **KSC250ABCB4** | 4.8 |
| 400 | Communication box for KSC feeder 400 A | **KSC400ABCB4** | 5.3 |

**KSC250ABCB4**

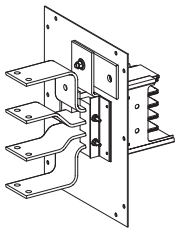



**KSC400ABCB4**




- It is designed to install measurement system (PM5350) and protection (Acti 9).
- It is fixed to replace the lids of end feed units KSC250AB4 and KSC400AB4.
- The equipment must be ordered separately depending on the installation.

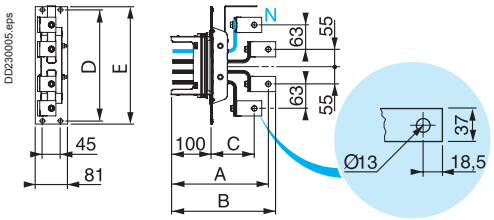
## Flange feed units



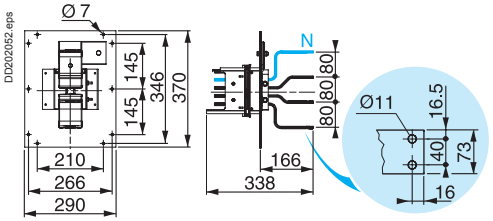

KSC250AE4

| Rating (A) | Direction (edgewise) | Cat. no. |
|---|---|---|
| 250 | Left or right | **KSC250AE4** |
| 400 | Left or right | **KSC400AE4** |
| 800 | Left or right | **KSC800AE4** |

**KSC250AE4 and KSC400AE4**

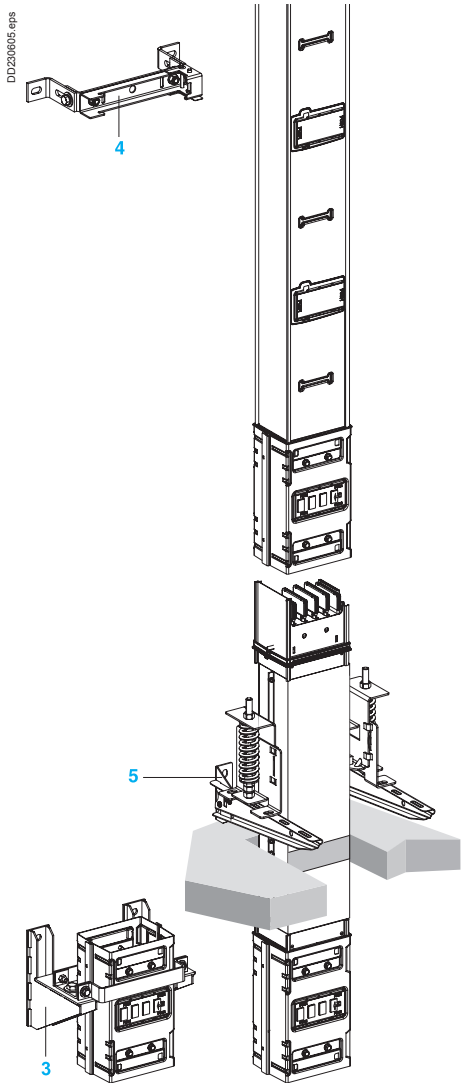


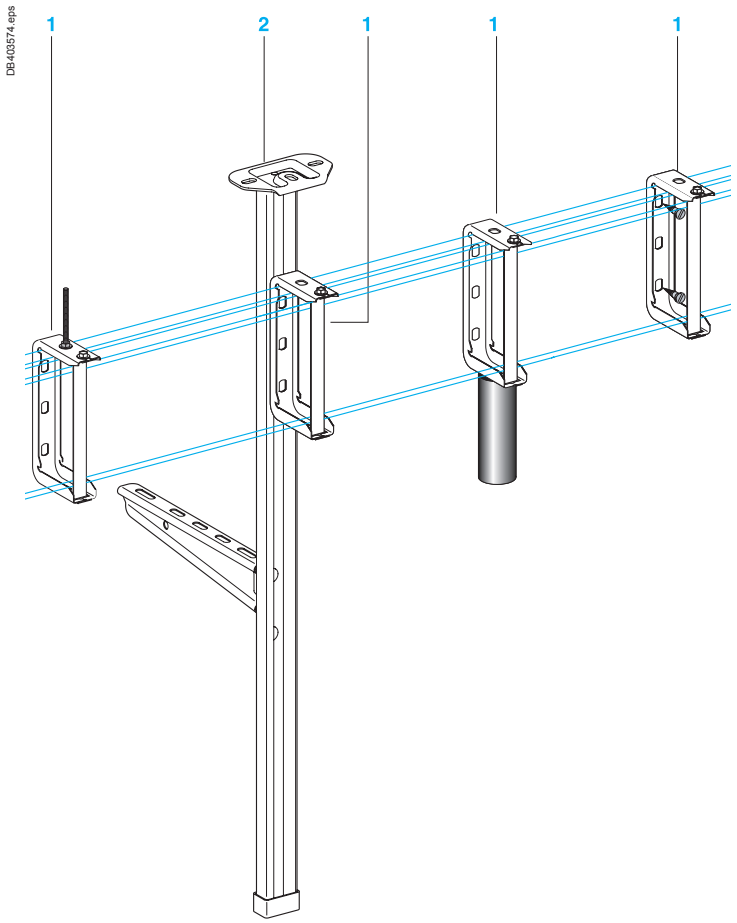

**KSC800AE4**




| Dimensions | 250 A | 400 A |
|---|---|---|
| A | 243 | 261 |
| B | 261.5 | 279.50 |
| C | 108 | 117 |
| D | 278 | 318 |
| E | 294 | 334 |

# Fixing systems
## For horizontal trunking and rising mains




The maximum recommended fixing distance is three metres.

1 **Universal fixing bracket**
For attachment of the busbar trunking to the structure of the building, either directly or via a threaded rod, brackets, etc.
Suspension using chains or steel cables is not advised.

2 **Pendant kit**
The pendant kit includes:
- a perforated pendant used to suspend a KS line from the building structure, an IPN or the ceiling.
Length: 1 meter
Width: 80 mm
- a cantilever arm that supports the cable tray under the KS line
- the mounting hardware required to secure the KS bracket and the cantilever arm to the pendant.

Two kits are available:
- KS Rating up to 400 A: 200 mm cantilever arm
- KS Rating from 500 A to 1000 A: 300 mm cantilever arm.

If necessary, additional cantilever arms can be ordered.

3 **Bottom support**
This component attaches to the first jointing unit at the base of the riser and is secured to the wall by two brackets. It supports the entire riser (see height limitations on the previous page).
***Note:*** *the foot of the riser is a special jointing unit to which a wall bracket is installed.*

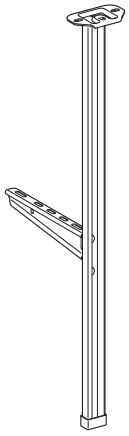
4 **Guides**
These guides, clipped to the riser, maintain it in the vertical position on each floor. They not block access to the tap-off outlets.

5 **Floor supports**
Secured to the floor or wall (via Canalis 200 mm cantilever arms), they attach to the sides of a special component (with or without fire barrier).

# Fixing systems for horizontal trunking

## Pendant kit

DD202196.eps



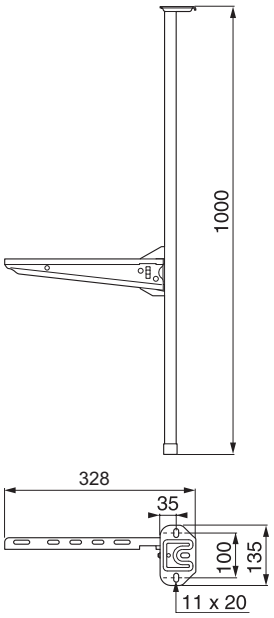
*Pendant kit.*

| Rating (A) | Max. load (kg) | Mounting | Order in multiple of | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|
| 100 to 400 | 80 | Under ceiling or I-beam (1) | 4 | **KSB400ZFKP1** | 2.70 |
| 500 to 1000 | 80 | Under ceiling or I-beam (1) | 4 | **KSB1000ZFKP1** | 2.80 |

*(1) Maximun recommended distance between fixings: 3 meters.*

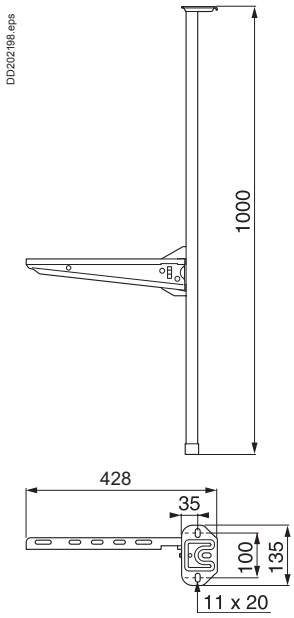
**KSB400ZFKP1**

DB403871.eps



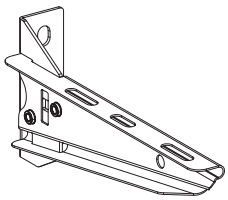

**KSB1000ZFKP1**

DD202198.eps




## Cantilever arm, 200 mm

DD210317.eps

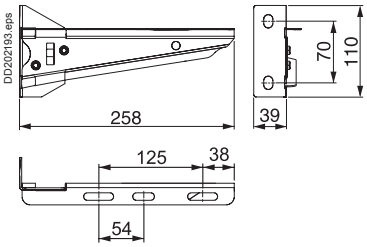


*Cantilever arm, 200 mm.*

| Rating (A) | Max. load (kg) | Mounting | Order in multiple of | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|
| 100 to 400 | 220 | Wall or pendant | 4 | **KFBCA81200** | 0.40 |

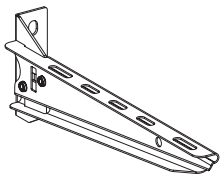
**KFBCA81200**

DD202193.eps




## Cantilever arm, 300 mm

DD202197.eps

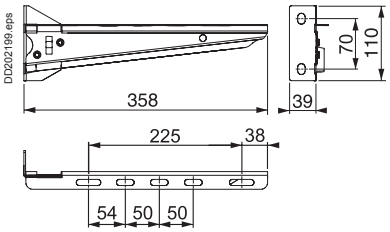


*Cantilever arm, 300 mm.*

| Rating (A) | Max. load (kg) | Mounting | Order in multiple of | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|
| 500 to 1000 | 200 | Wall or pendant | 4 | **KFBCA81300** | 0.60 |

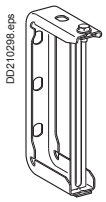
**KFBCA81300**

DD202199.eps

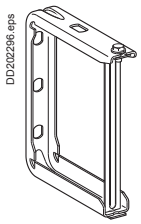


# Fixing systems for horizontal trunking

## Fixing bracket




*Fixing bracket from 100 to 400 A*

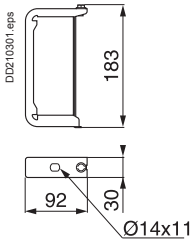



*Fixing bracket from 500 to 1000 A*

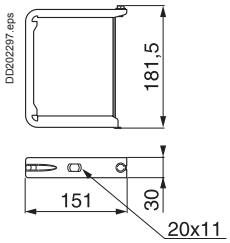
| Rating (A) | Max. load (kg) | Mounting | Order in multiples of | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|
| 100 to 400 | 70 | Wall or suspended on threaded rod (1) | 10 | **KSB400ZF1** | 0.30 |
| 500 to 1000 | 70 | Wall or suspended on threaded rod (1) | 10 | **KSB1000ZF1** | 0.40 |
| 100 to 400 | - | Wall or suspended on threaded rod (1) | 10 | **KSA80EZ3** | 0.30 |
| 100 to 400 | - | Wall or suspended on threaded rod (1) | 10 | **KSA80ZG20** | 0.30 |
| All | - | Floor | 5 | **KSA80EZ5** | 0.70 |

*(1) Maximun recommended distance between fixings: 3 meters.*

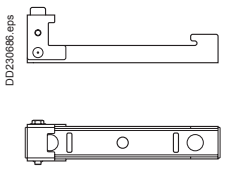
**KSB400ZF1**




**KSB1000ZF1**




**KSA80EZ5**

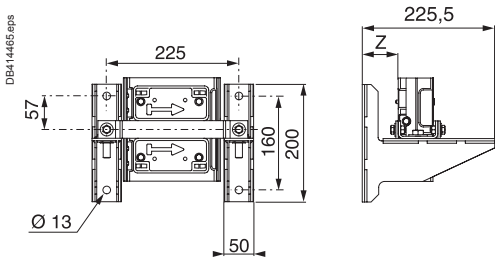


## Bottom support

| Rating (A) | Max. permissible weight (kg) | Cat. no. | Weight (kg) |
|---|---|---|---|
| 250 | 680 | **KSB250ZV1** | 4.50 |
| 400 | 680 | **KSB400ZV1** | 5.00 |
| 500 to 630 | 1760 | **KSB630ZV1** | 7.00 |
| 800 to 1000 | 1760 | **KSB1000ZV1** | 7.30 |

**KSB●●●ZV1**

**55 mm ⩽ Z ⩽ 105 mm**




## Floor guide

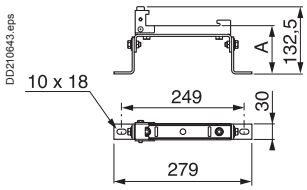
Used with the bottom support.

| Rating (A) | Cat. no. | Weight (kg) |
|---|---|---|
| All | **KSB1000ZV2** | 0.70 |

For floors higher than 3.5 metres, it is advised to use two guides per floor.

**KSB1000ZV2**

**65 mm ⩽ A ⩽ 95 mm**



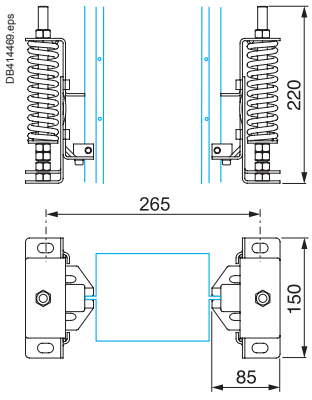

## Floor supports

Set of 2 floor supports.

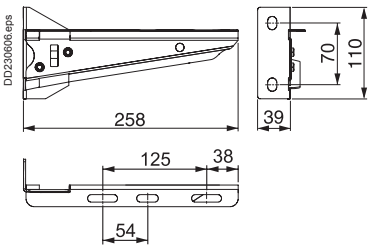
| Rating (A) | Max. permissible weight (kg) | Mounting | Cat. no. | Order in multiple of | Weight (kg) |
|---|---|---|---|---|---|
| **Set of 2 floor supports** | | | | | |
| All | 440 | Floor or cantilever arm | **KSB1000ZV3** | 1 | 1.80 |
| **Cantilever arm, 200 mm** | | | | | |
| All | 220 | Wall | **KFBCA81200** | 4 | 0.40 |

For floors higher than 3.5 metres, it is advised to use a floor guide in addition to the support.

**KSB1000ZV3**




**KFBCA81200**



# Contents

# Tap-off units
## From 100 to 1000 A

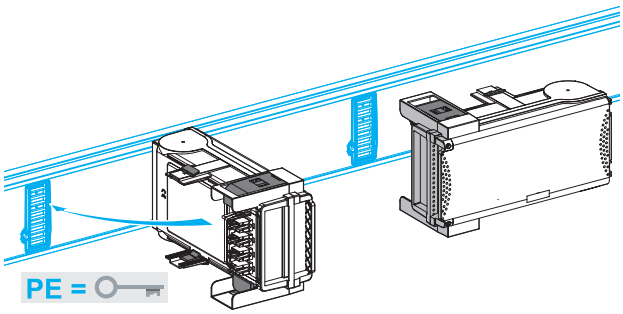
## Tap-off units

For rapid connection of loads or secondary lines, in compliance with installation standards IEC 60364 and regulations, whatever the system earthing arrangement (TT, TNS, TNC or IT).
They can be handled and removed under off-load conditions with the trunking energised.
The tap-off outlets are automatically opened or closed when tap-off units are connected or removed.
With the cover open, no live parts are accessible.

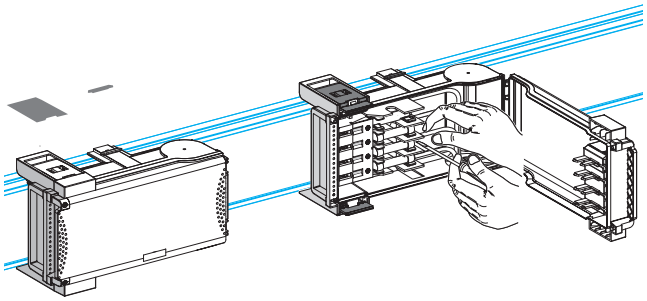
***The degree of protection is IPxxB*** (protected against access with a finger).

***The degree of protection is IP55 for indoor installations as standard*** (no accessories are required).

DD206164.eps



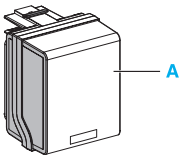

DD206165.eps



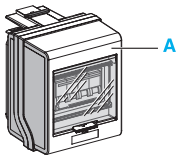
**Tap-off units (A) and tap-off units with isolators (B) up to 100 A are made of plastic:**

■ Colour: RAL 9001 white for the casing and the grip zones and transparent green for the cover,The fixing mechanisms are in RAL 7016.
■ Material: self-extinguishing, ***halogen free*** insulating plastic (fire resistant and very high temperature withstand).
■ Other characteristics: cable gland drilling zone, stainless steel screws and the door can be lead sealed.

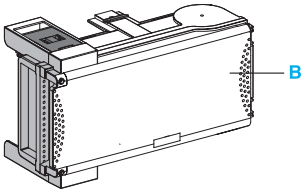
DD210277.eps



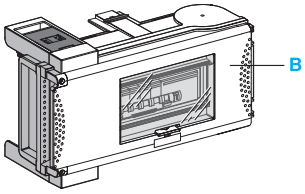

DD210278.eps




DD210279.eps



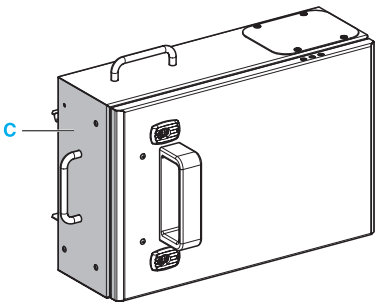

DD210280.eps




**Tap-off units from 160 to 400 A are made of sheet steel (C):**

■ Colour: RAL 9001 white for the casing, RAL 9005 black for the grip zones (100 % polyester paint on galvanised sheet steel).
■ 400 A tap-off units can be only installed on straight lengths ⩾ 500 A.
■ Other characteristics:
□ removable cover with hinges enabling opening up to 120°, vertically bevelled cover with double bends for enhanced rigidity, polyurethane gaskets
□ equipped with cable-gland plates marked every 25 mm and designed for maximum access.

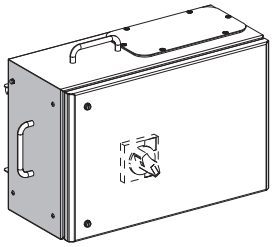
DD210281.eps




**Disconnection principle:**

Disconnection by unplugging the tap-off unit.
The access to the electrical devices and the terminals is possible only when the tap-off unit is unplugged (i.e. not energised).
A safety device prevents connection to the trunking when the cover has been removed.

DD210461.eps



Disconnection of tap-off units with fuses and modular devices (category AC22 to AC20) is obtained by opening the tap-unit cover.

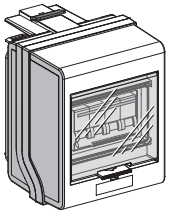
**Tap-off unit disconnection by opening or closing the cover should be carried out only if the downstreamload is de-energised.**

**For tap-units with circuit breakers, a number of safety devices prevents from:**
- plugging and unplugging in the tap-off unit when the cover is closed
- closing the cover before the tap-off unit is locked onto the trunking
- having access to the electrical equipment and the terminals when energised
- opening the cover in the position “ON” (tap-off units equipped with a Compact NSX or NG circuit breaker)
- the tap-off units accept modular devices in multiples of 18 mm wide modules.

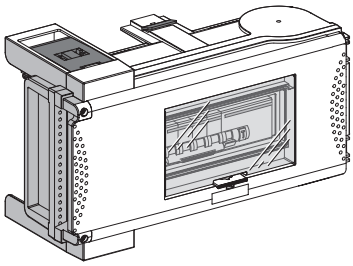
These tap-off units can be equipped with certain accessories such as circuit-opening contacts on the cover, lead seals, etc.

## Tap-off units for circuit breakers (not equipped)

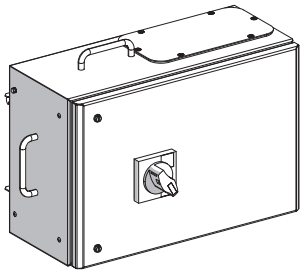
DD210282.eps



DD210283.eps



DD210284.eps



Tap-off unit covers can be lead sealed to prevent circuit-breaker switching by unauthorised persons.

**Tap-off unit for modular devices**
This tap-off unit can be equipped with most modular devices of the Acti 9 type:
- rated current: 32 A
- capacity: 5 modules
- with a window in front for visual and physical access to the devices. A transparent cover seals the window.

**Tap-off units, with isolators, for modular devices**
These tap-off units accept most modular devices of the Acti 9 type. They have a window in front for visual and physical access to the devices. A transparent cover seals the window.
Two rating are available:
- maximum rated current 63 A for eight modules
- maximum rated current 100 A for twelve modules.

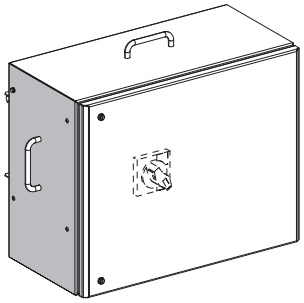
**Tap-off units, with isolators, for NG type modular devices**
These tap-off units are equipped with a DIN rail.
The devices are operated by rotary handles that prevent door opening with the circuit breaker in “On” position.
- maximum rated current: 160 A
- capacity: 13 modules (accepts NG125 or NG160 devices equipped with Vigi modules).

**Tap-off units, with isolators, for Compact NSX circuit breaker**
These tap-off units are equipped with mounting plates and upstream connections for Compact NSX circuit breakers:
- rated current: 100 to 400 A, N, H or L versions
- fixed, front connection, rotary handle
- for Compact NSX + Vigi module, use tap-off units for measurements and metering (see below).

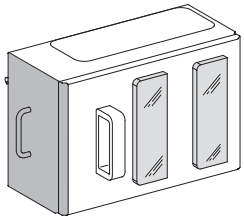
***Note:*** *for options such as withdrawable circuit breakers, earth-leakage protection, etc, call your Schneider Electric contact.*

## Tap-off units for measurements and metering (not equipped)

DD210286.eps



DD230656.eps



DB414226-40.eps

They are equipped with:
- a mounting plate for a Compact NSX type circuit breaker with an extended rotary handle and a Compact NSX current transformer module
- a DIN rail for installation of a Powerlogic PM810, a set of terminals, etc.

These tap-off units are used for sub-billing and monitoring of secondary lines. The values measured by the TI module of the Compact NSX are transmitted to the power-monitoring unit that forwards the information to a central unit via a bus.

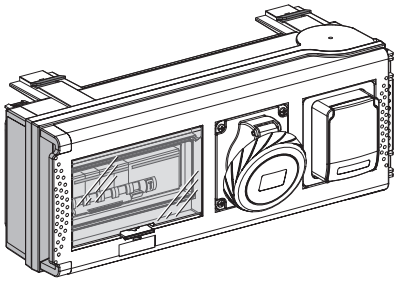
Under severe operating conditions (> 40 °C ambient temperature), we recommend using a PM810 without a display.

Possibility to install a metering tap-off unit using those equipments:
- empty tap-off unit
- window for modular equipment (IP65)
- mounting plate
- current transformer
- iC60N circuit-breaker.

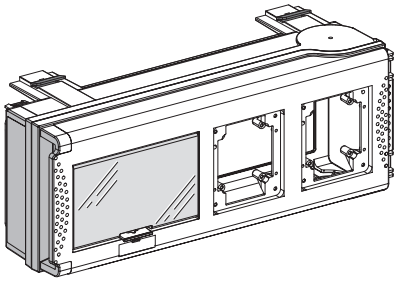
# Tap-off units
From 100 to 1000 A

## Tap-off units for power sockets (not equipped)

DD210302.eps



DD210459.eps



Tap-off unit covers can be lead sealed to prevent circuit-breaker switching by unauthorised persons.

**Canalis 32 A tap-off unit for power sockets**
For the supply of portable loads equipped with household or industrial plugs in a garage, maintenance workshop, laboratory, battery charging room, etc.
For installation on trunking mounted on a wall for better access.
For easy access, install on trunking mounted at an appropriate height on the wall.
Flexibility, upgradeability: positioned as close as possible to the loads, extension leads are not required
***Degree of protection: IP55, IK08***.
***Safety of persons: IPxxD***, earth-leakage protection.

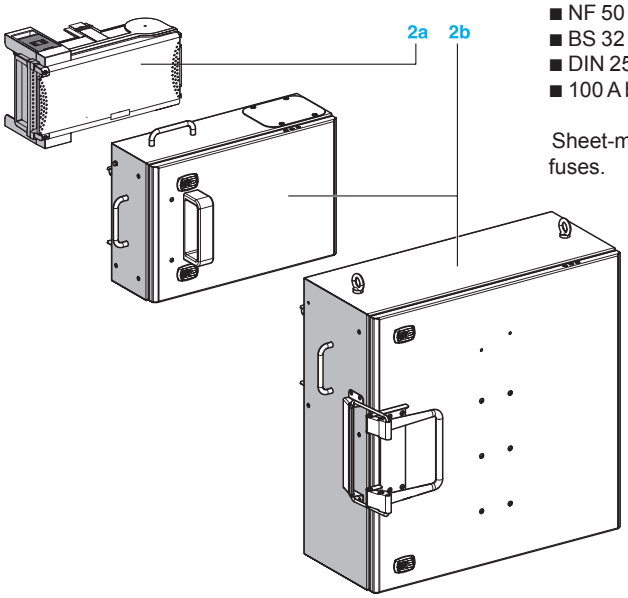
Rated current: 32 A
Capacity: 8 modules in multiples of 18 mm wide
Two versions are available:
■ pre-equipped with a power sockets
■ customisable:
□ two 90 x 100 mm openings for PK-type (screw connections) or PratiKa (fast and reliable connection without stripping) industrial or household sockets
□ direct mounting for industrial IEC 16 A 5P or IEC 32
A 3, 4 or 5P sockets
□ mounting on a 65 x 85 mm clip-on adapter plate for industrial IEC 16 A 3P or 5P and household 10 / 16 A 2P + PE sockets.

## Tap-off units for fuses (not equipped)

For protection of the tap-off by fuses (not supplied).

**1 Tap-off unit with fuse holders**
This tap-off unit exists in three versions:
■ for NF 10 x 38 fuses
■ for BS type 88 A1 fuses
■ for DIN type Neozed E14 fuses.

DD210288.eps

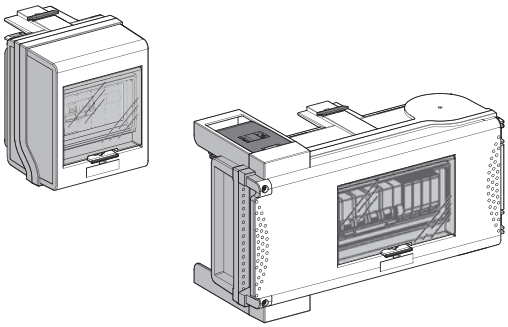



**2a and 2b Tap-off units, with isolator, for fuses**
There are two types of tap-off units:
Plastic tap-off units (2a) equipped with fuse holders for:
■ NF 50 to 100 A cylindrical fuses
■ BS 32 to 80 A screw fuses
■ DIN 25 to 63 A screw fuses
■ 100 A blade-type fuses.

Sheet-metal tap-off units (2b) equipped with fuse holders for 160 to 400 A blade-type fuses.

## Tap-off units (with and without isolators) equipped with a surge arrester

DB403839.eps



These tap-off units (with and without isolators) are pre-equipped with a modular Type 2 surge arrester, with integrated disconnection device.

2 versions of 3P+N protection are available, based on Quick PF10 or Quick PRD40r.

These units are ready for use, can be plugged directly into the busbar trunking and do not require any additional wiring.

They should be positioned at least 30 m upstream of each load to be protected.

Tap-off unit covers can be lead sealed to prevent the surge arrester being tampered with by unauthorised persons.

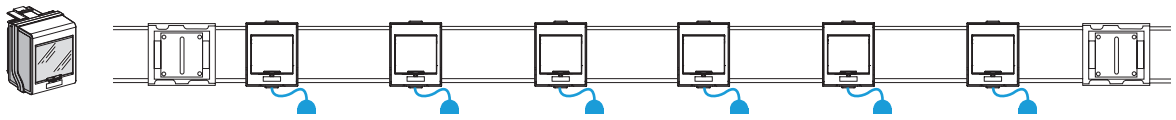
# Compatibility of tap-off units and busbar trunkings

The number of tap-off units presented below corresponds to an installation on a single side of the Canalis prefabricated busbar trunking system.
This number is doubled for installations in which the tap-off units can be mounted on both sides.

## 3m length from 100 to 400 A

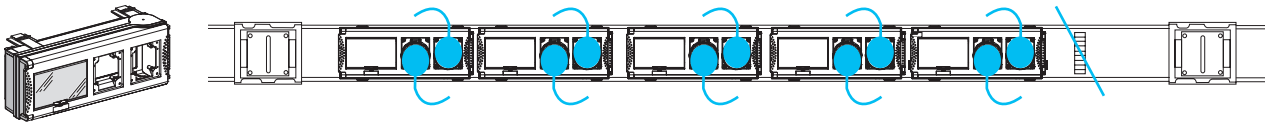
**KSB32CM55** **KSB32CF5** **KSB16CN5** **KSB20CG5**

DD230627.eps



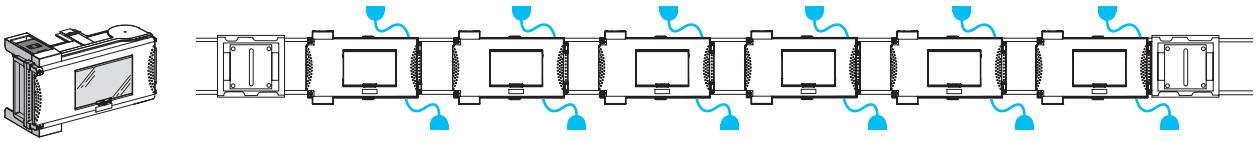
**KSB32CP●**

DD230631.eps



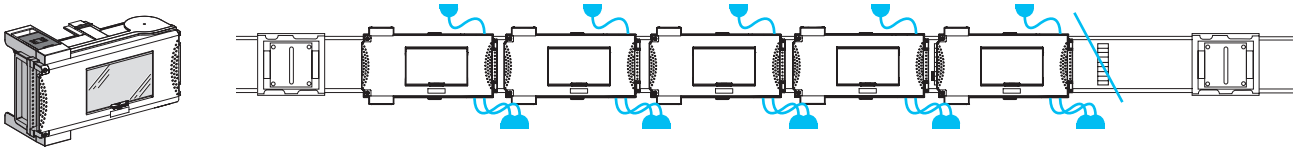
**KSB63SM●8** **KSB50SF●** **KSB25SD●** **KSB32SG4** **KSB50SN●**

DB405627.eps



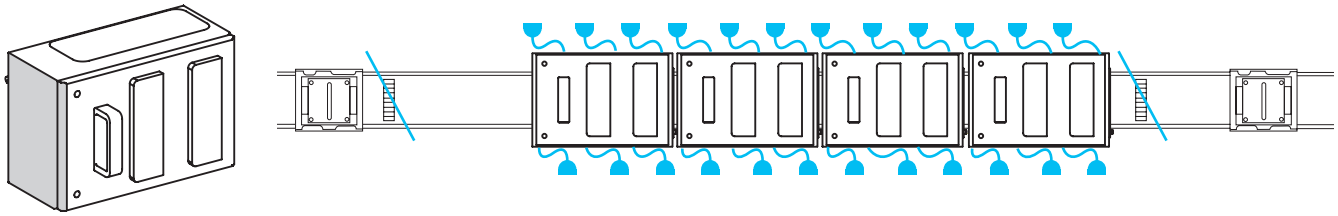
**KSB100SM●12** **KSB100SF●** **KSB100SE●** **KSB63SD●**

DD220629.eps



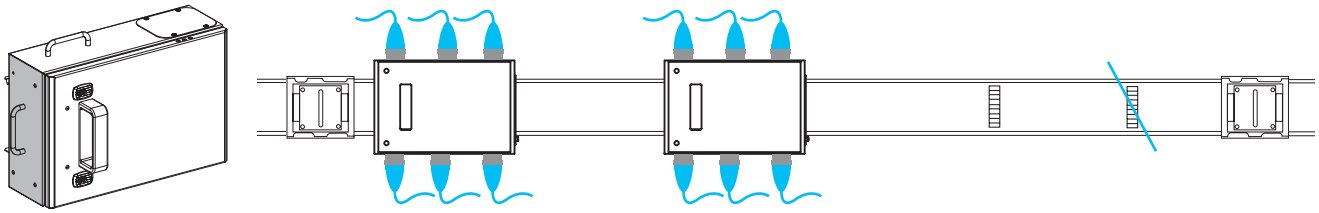
**KSB160SM●24** **KSB160DC●** **KSB160SE●** **KSB160SF●**

DD230630.eps



**KSB250SE●**

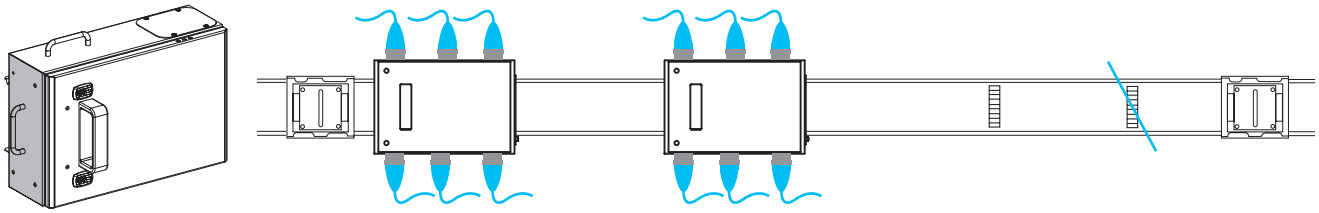
DB416187R.eps



## 3m length from 500 to 800 A

**KSB400●●●**

DB416187R.eps



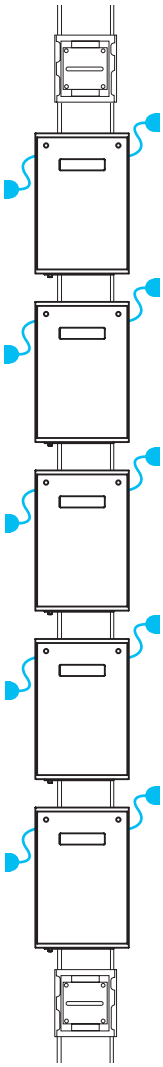
: *Outlets not usable for this type of tap-off.*

# Rising mains for 2 m or 2.5 m lenght

## From 100 to 400 A

**Tap-off outlets usable for the tap-off units from 16 to 125 A**

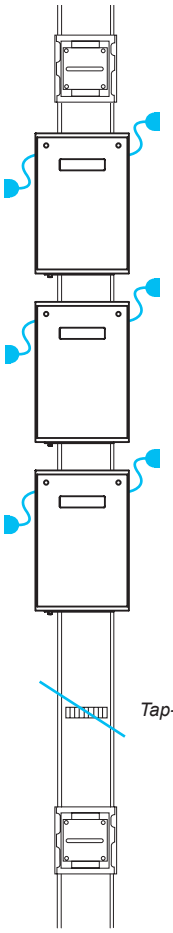
DB416224.eps



## From 500 to 800 A

**Tap-off outlets usable for the tap-off units from 16 to 400 A**

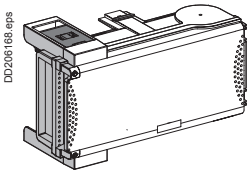
DB416226.eps



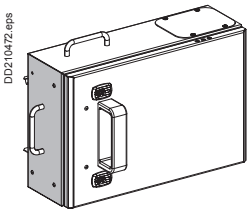
*Tap-off outlet not usable for KSB400D●●●● tap-off units.*

# 50 to 160 A empty tap-off units

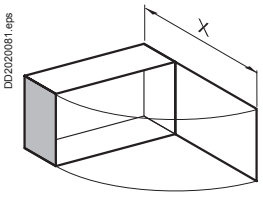
## Empty tap-off units



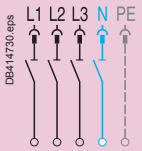
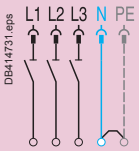

**KSB●●●SV●**




**KSB160SV●**



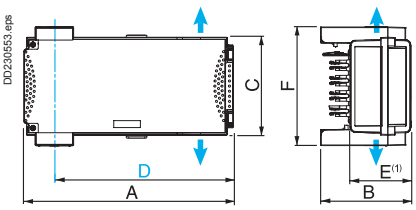

X = 432.5 (KSB50SV●)
X = 545.5 (KSB100SV●)
X = 630.5 (KSB160SV●)

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |   |   |

| Rating (A) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|
| 50 | **KSB50SV4** | **KSB50SV5** | 2.20 |
| 100 | **KSB100SV4** | **KSB100SV5** | 4.80 |
| 160 | **KSB160SV4** | **KSB160SV5** | 8.00 |

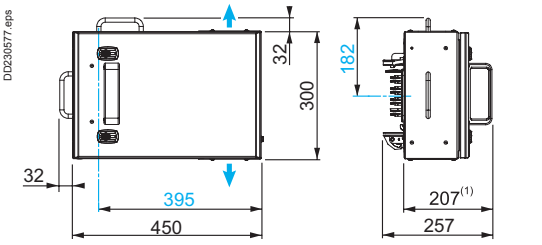
*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*

**KSB50SV●, KSB100SV●**




| Dim. | 50 A | 100 A |
|---|---|---|
| A | 356 | 444 |
| B | 153 | 178 |
| C | 167 | 202 |
| D | 309 | 397 |
| E | 103 | 128 |
| F | 202 | 220 |

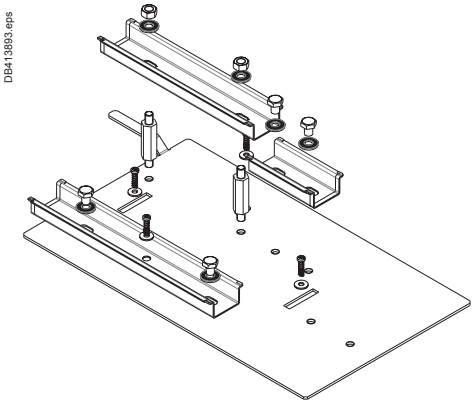
**KSB160SV●**




*Cable exit*
*Centre line of tap-off outlets*

*(1) Protruding*

## Plate for feed units

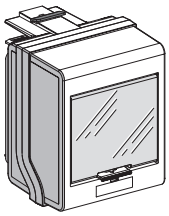



**KSB63PMP**

| Designation | Rating (A) | Cat. no of tap-off units | Mounting | Cat. no |
|---|---|---|---|---|
| For feed units | 63 | **KSB63SM48** **KSB63SM58** | Fixing with equipements type EGX | **KSB63EGP** |
| | 100 | **KSB100SV4** **KSB100SV5** | Fixing with power meter equipments | **KSB63PMP** |

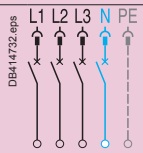
# 32 to 100 A tap-off units for modular devices

## Tap-off units




**KSB32CM55**

Disconnection by unplugging the tap-off unit.

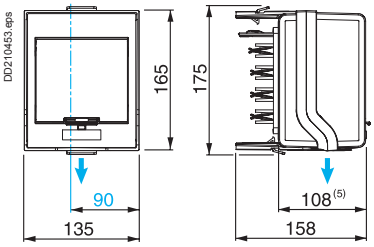
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |



| Rating (A) | Number of 18 mm modules (3) | Connection | Max. size (mm²) | | Cable gland (4) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 32 | 5 | Pre wired | 6 | 10 | ISO 32 max. | **KSB32CM55** | 0.60 |

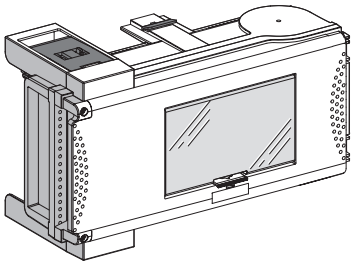
*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Supplied with blanking plate (1 x 5 divisible).*
*(4) Maximum diameter for a multipolar cable.*

**KSB32CM55**



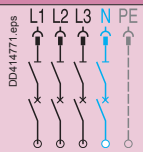
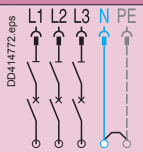

*Cable exit*
*Centre line of tap-off outlets*
*(5) Protruding*

## Tap-off units with isolator




**KSB63SM ●8**
**KSB100SM ●12**

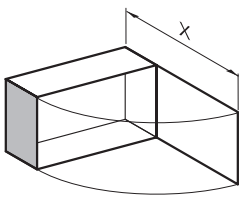
Disconnection by opening the tap-off unit cover.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |  |



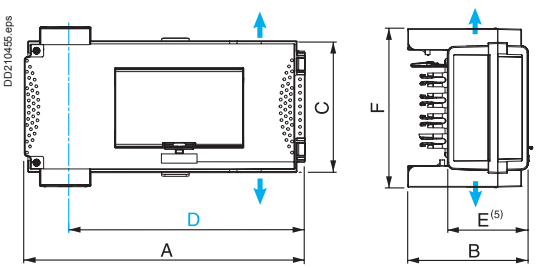
| Rating (A) | Number of 18 mm modules (3) | Connection | Max. size (mm²) | | Cable gland (4) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 63 | 8 | Copper cable lugs | 16 | 16 | ISO 50 max. | **KSB63SM48** | **KSB63SM58** | 2.40 |
| 100 | 12 | Copper cable lugs | 35 | 35 | ISO 63 max. | **KSB100SM412** | **KSB100SM512** | 5.00 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed).*
*(3) Supplied with blanking plates: (1 x 5 divisible (8 modules) or 2 x 5 divisible (12 modules)).*
*(4) Maximum diameter for a multipolar cable.*




X = 432.5 (KSB63SM●8)
X = 545.5 (KSB100SM●12)

**KSB63SM ●8, KSB100SM ●12**

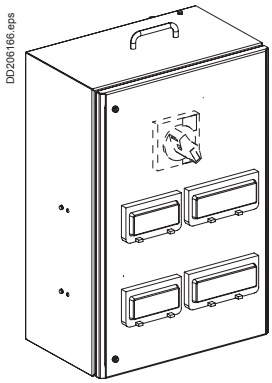



*Cable exit*
*Centre line of tap-off outlets*
*(5) Protruding*

| Dim. | 63A | 100A |
|---|---|---|
| A | 357 | 444 |
| B | 158 | 183 |
| C | 167 | 202 |
| D | 309 | 397 |
| E | 108 | 133 |
| F | 202 | 220 |

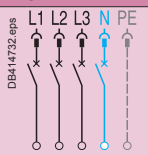
# 250 A tap-off unit for Compact NSX circuit breaker and modular devices

## 28-modules tap-off unit for Compact NSX circuit breakers and modular devices




**KSB250SM428**

Supplied with 2 DIN rails for 28-modules mounting.
Protection degree: IP31.
The rear panel of the tap-off unit has a particular shape for the fixing above a tap-off outlet.
The cover of the tap-off unit may be opened only when the main circuit breaker is in the On / Off position.

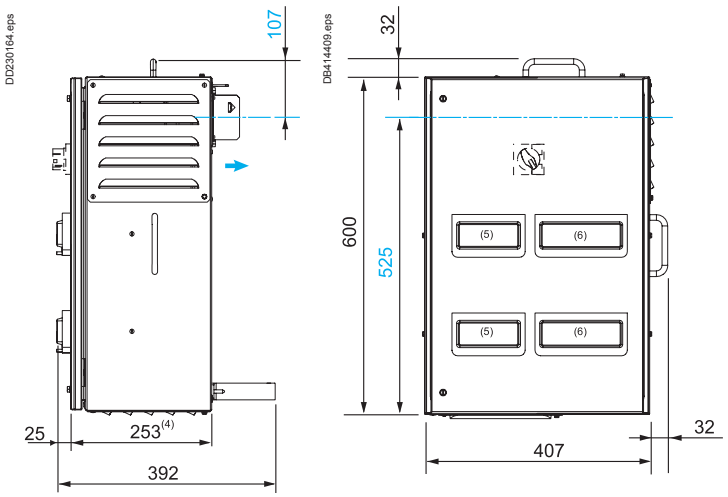
| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |



| Rating (A) | Type of circuit breaker | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 250 | NSX 250 Curve N, H or L | NSX | 70 | 150 | ISO 32 max. | **KSB250SM428** | 13.50 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

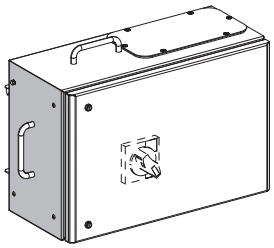
**KSB250SM428**




*Cable exit*
*Centre line of tap-off outlets*

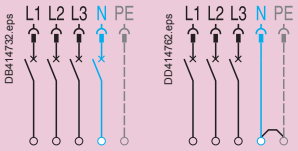
*(4) Protruding*
*(5) 6 modules*
*(6) 8 modules*

## Tap-off units for Compact NSX, fixed, front-connected circuit breakers




**KSB●●●DC●**

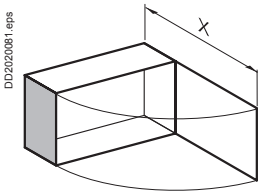
The cover of the tap-off unit may be opened only when the circuit breaker is in the On / Off position.

| | | | |
|---|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |  | |



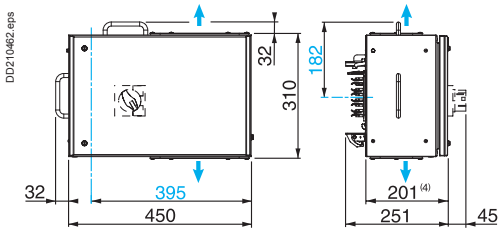
| Rating (A) | Type of circuit breaker | Connection | Max. size (mm²) Flexible | Max. size (mm²) Rigid | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| 160 | NSX 100 or NSX 160 Curve N, H or L Rotary handle 29338 | NSX | 70 | 70 | ISO 32 max. | **KSB160DC4** | **KSB160DC5** | 9.00 |
| 250 | NSX 250 Curve N, H or L Rotary handle 29338 | NSX | 150 | 150 | ISO 40 max. | **KSB250DC4** | **KSB250DC5** | 12.50 |
| 400 | NSX 400 Curve N, H or L Rotary handle 32598 | NSX | 240 | 240 | ISO 50 max. | **KSB400DC4** | **KSB400DC5** | 18.00 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

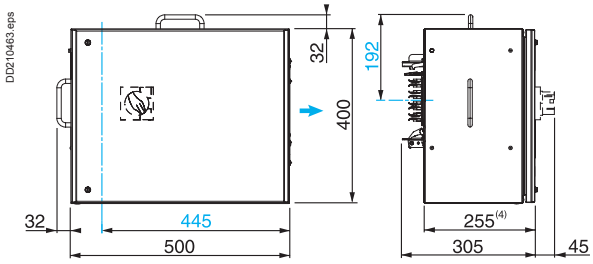



X = 625.5 (KSB160DC●)
X = 726.5 (KSB250DC●)
X = 976.5 (KSB400DC●)

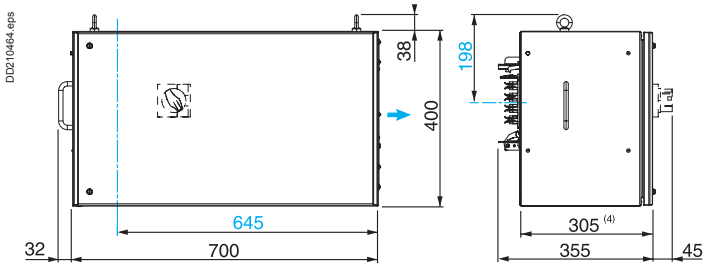
**KSB160DC●**




**KSB250DC●**




**KSB400DC●**

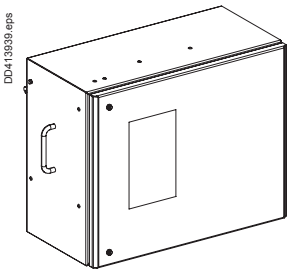



*Cable exit*
*Centre line of tap-off outlets*

*(4) Protruding*

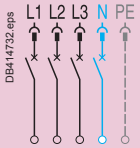
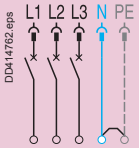
# 160 to 400 A tap-off units for Compact NSX circuit breaker

## Tap-off units for Compact NSX circuit breakers with electrical handle



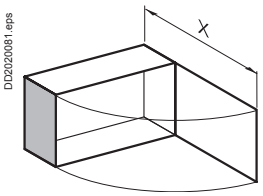

**KSB●●●DB●12**

The cover of the tap-off unit may be opened only when the circuit breaker is in the On / Off position.

| | | | |
|---|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |   |   |

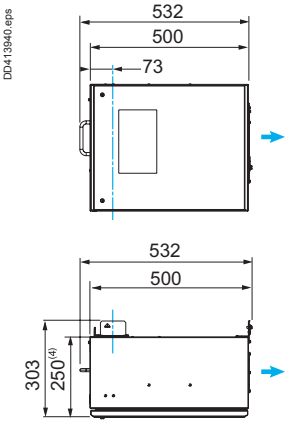
| Rating (A) | Type of circuit breaker | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 160 | NSX 160 Curve N, H or L | NSX | 70 | 70 | ISO 32 max. | **KSB160DB412** | **KSB160DB512** | 13.50 |
| 400 | NSX 400 Curve N, H or L | NSX | 240 | 240 | ISO 50 max. | **KSB400DB412** | **KSB400DB512** | 19.00 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

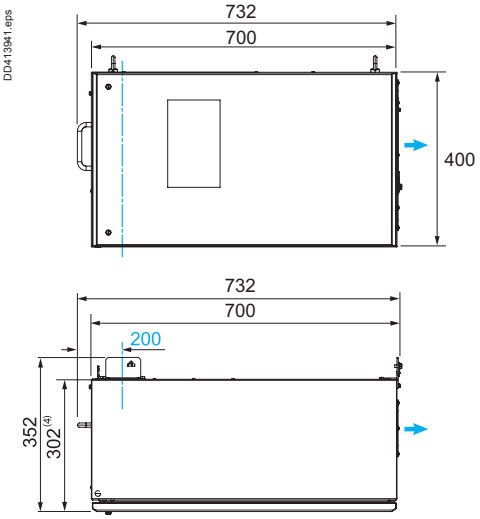



X = 727.5 (KSB160DB●12)
X = 973.5 (KSB400DB●12)

**KSB160DB●12**



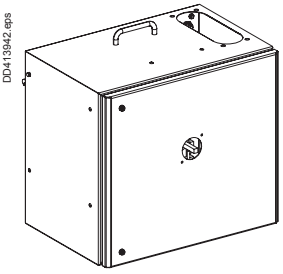

**KSB400DB●12**




*Cable exit*
*Centre line of tap-off outlets*

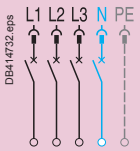
*(4) Protruding*

## Tap-off units for Compact NSX, plug-in, circuit breakers




**KSB160DD411**

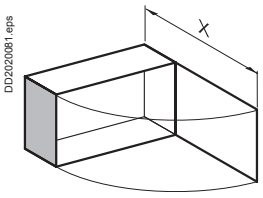
The cover of the tap-off unit may be opened only when the circuit breaker is in the On / Off position. Tap-off units KSB250DD412 includes 2 opening for type FL21 cable gland plate (not supplied) (see page 60).

| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |



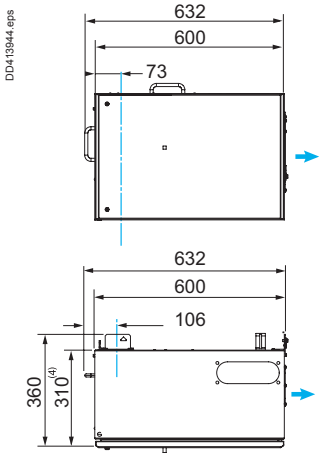
| Rating (A) | Type of circuit breaker | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 160 | NSX 160 plug-in Curve N, H ou L Rotary handle | NSX | 70 | 70 | ISO 32 max. | **KSB160DD411** | 13.50 |
| 250 | NSX 250 plug-in Curve N, H or L Motorized handle | NSX | 150 | 150 | ISO 40 max. | **KSB250DD412** | 16.00 |
| 400 | NSX 400 plug-in Curve N, H or L Rotary handle | NSX | 240 | 240 | ISO 50 max. | **KSB400DD411** | 20.00 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

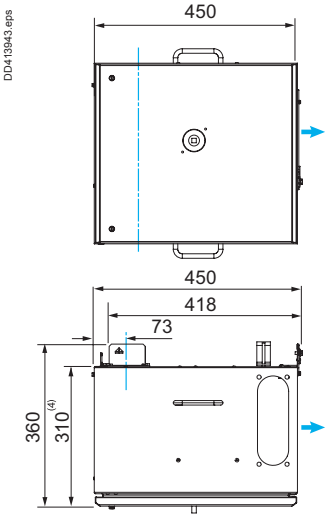



X = 727 (KSB160DD)
X = 877 (KSB250DD)
X = 1073 (KSB400DD)

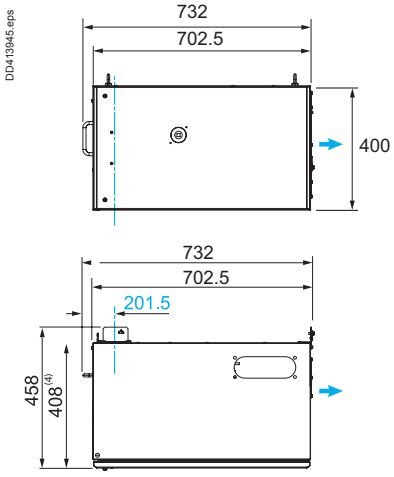
**KSB160DD411**




**KSB250DD412**




**KSB400DD411**

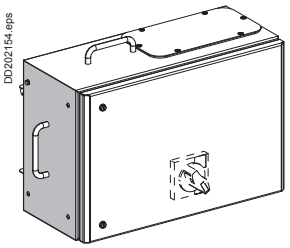



*Cable exit*
*Centre line of tap-off outlets*

*(4) Protruding*

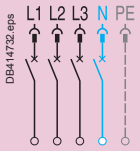
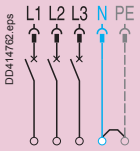
# 160 A tap-off units for NG modular devices

## Tap-off units for NG modular devices




**KSB160SM●13**

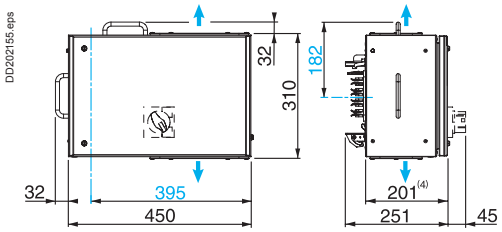
The cover of the tap-off unit may be opened only when the circuit breaker is in the On / Off position.

| | | | |
|---|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |   |   |

| Rating (A) | Type of circuit breaker | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 160 | Rotary handle 28060 - NG160<br>Rotary handle 19088 - NG125 | NG | 70 | 70 | ISO 32 max. | **KSB160SM413** | **KSB160SM513** | 8.50 |

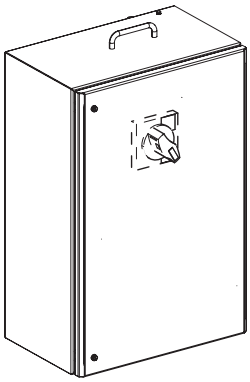
*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

**KSB160SM●13**



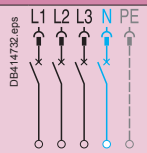
# 250 A tap-off unit for Compact NSX circuit breaker and other devices

## Tap-off unit to mount on jointing unit for Compact NSX circuit breakers and other devices




**KSB250DC4SP**

Supplied with 2 DIN rails for 25-modules mounting.
The rear panel of the tap-off unit has a particular shape for the fixing above a tap-off outlet.
The cover of the tap-off unit may be opened only when the main circuit breaker is in the On / Off position.

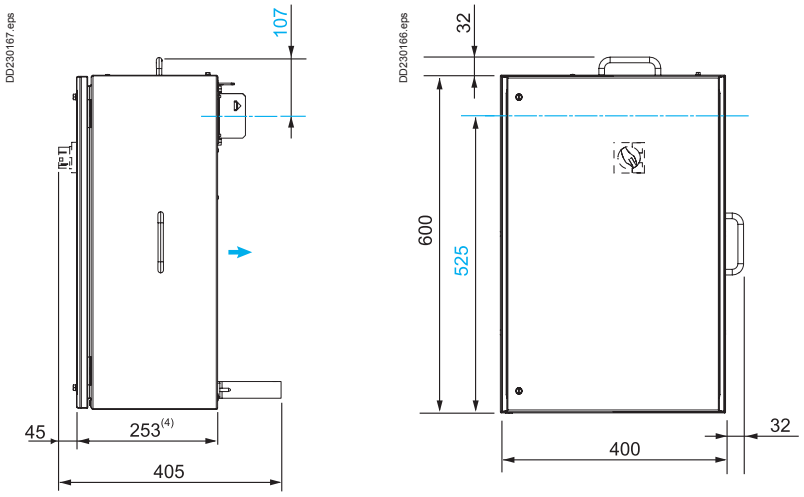
| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |



| Rating (A) | Type of circuit breaker | Connection | Max. size (mm²) | | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 250 | NSX 250 Curve N, H or L | NSX | 70 | 150 | ISO 32 max. | **KSB250DC4SP** | 13.50 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

**KSB250DC4SP**



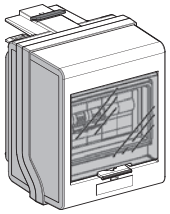

*Cable exit*
*Centre line of tap-off outlets*

*(4) Protruding*

# Tap-off units equipped with a surge arrester

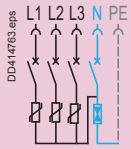
## Tap-off units equipped with a surge arrester

DD205753.eps



**KSBQPF**

Disconnection by unplugging the tap-off unit.

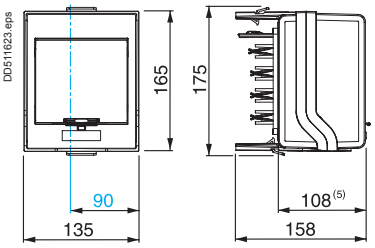
| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT - TNS - TNC |
| Tap-off polarity | | 3L + N + PE (1) |
| Diagram | |  |



| Protection type | Lightning arrester cartridges (supplied) | Connection | Permissible short-circuit Isc (kA) | Max. discharge current Imax (kA) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|
| Type 2 | Fixed | Pre-wired | 6 | 10 | **KSBQPF** | 1.3 |

*SPD (Surge Protection Device) installed: Quick PF10 SPD, 3P+N, cat. no. 16618 (Type 2 monoblock surge arrester, with fixed cartridges and integrated disconnection device, certified IEC 81643-1, EN 61643-11).*
***(1)** Also suitable for tap-off unit 3L + PE (N not distributed).*

DD511623.eps



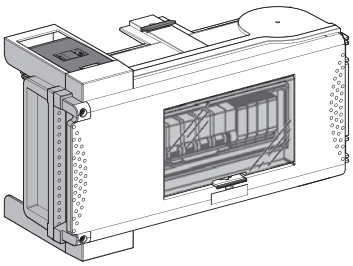


*Centre line of tap-off outlets*

***(5)** Side projection.*

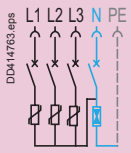
## Tap-off units with isolator equipped with a surge arrester

DD205754.eps



**KSBQPRD**

Disconnection by opening the tap-off unit cover.

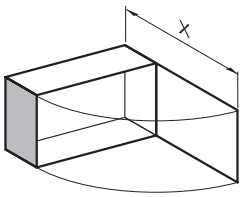
| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT - TNS - TNC |
| Tap-off polarity | | 3L + N + PE (1) |
| Diagram | |  |



| Protection type | Surge arrester cartridges (supplied) | Connection | Permissible short-circuit Isc (kA) | Max. discharge current Imax (kA) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|
| Type 2 | Removable | Pre-wired | 25 | 40 | **KSBQPRD** | 3.40 |

*Surge arrester installed: Quick PRD40r surge arrester, 3P+N, cat. no. 16294 (Type 2 monoblock surge arrester, with fixed cartridges and integrated disconnection device, certified IEC 81643-1, EN 61643-11).*
***(1)** Also suitable for tap-off unit 3L + PE (N not distributed).*

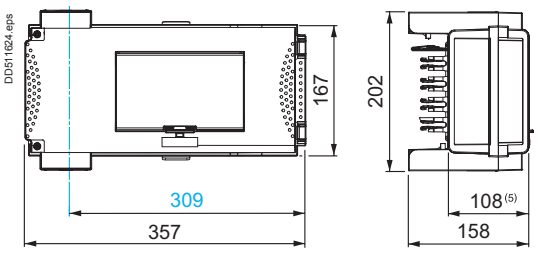
DD202008.eps





X= 432.5

DD511624.eps



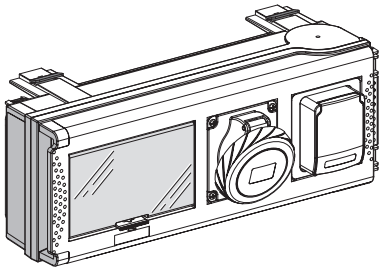


*Centre line of tap-off outlets*

***(5)** Side projection.*

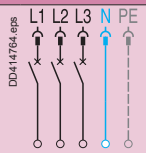
# 32 A tap-off units with power sockets protected by modular devices

## Tap-off units for power sockets




**KSB32CP●●●**

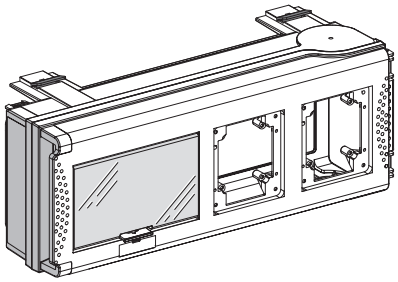
Disconnection by unplugging the tap-off unit.

| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC (1) |
| | Tap-off unit | TT-TNS-TNS (1) |
| Tap-off polarity | | 3L + N + PE |
| Tap-off diagram (e.g. circuit-breaker protection) | Tap-off unit wiring depends on the sockets used |  |



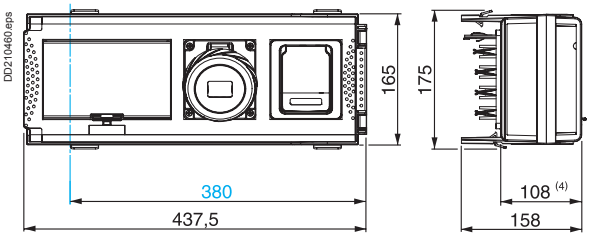
| Designation | Rating (A) | Number of 18 mm modules (2) | Equipment Q. (3) | Type | Current (A) | Voltage (V) | Polarity | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| Tap-off unit with flush-mounted power sockets | 32 | 8 | 2 | Household socket Schuko | 10/16 | 230 | 2P + T | **KSB32CP11D** | 2.90 |
| | | | 2 | Household socket NF | 10/16 | 230 | 2P + T | **KSB32CP11F** | 2.90 |
| | | | 1 | Household socket NF | 10/16 | 230 | 2P + T | **KSB32CP15F** | 3.00 |
| | | | 1 | Industrial socket | 16 | 415 | 3P+N+T | | |
| | | | 1 | Household socket Schuko | 10/16 | 230 | 2P + T | **KSB32CP15D** | 3.00 |
| | | | 1 | Industrial socket | 16 | 415 | 3P+N+T | | |
| | | | 1 | Industrial socket | 16 | 230 | 2P + T | **KSB32CP35** | 3.10 |
| | | | 1 | Industrial socket | 16 | 415 | 3P+N+T | | |
| Empty tap-off unit | 32 | 8 | To be equipped | | | | | **KSB32CP** | 2.70 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Supplied with blanking plate (1 x 5 divisible).*
*(3) Quantity.*




**KSB32CP**

**KSB32CP●●●**




*Centre line of tap-off outlets*

*(4) Protruding*

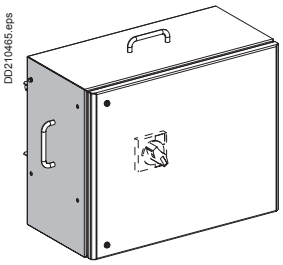

**PKY16F723**

| Designation | Rated current (A) | Rated voltage (V AC) | Number of poles | Dimensions (W x H in mm) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|
| Industrial sockets Pratika | 16 | 200-250 | 2P + T | 65 x 85 | **PKY16F723** | - |
| | | | 3P + N + T | 90 x 100 | **PKY16F725** | - |
| | | 380-415 | 2P + T | 65 x 85 | **PKY16F733** | - |
| | | | 3P + N + T | 90 x 100 | **PKY16F735** | - |
| | 32 (5) | 200-250 | 2P + T | 90 x 100 | **PKY32F723** | - |
| | | | 3P + N + T | 90 x 100 | **PKY32F725** | - |
| | | 380-415 | 2P + T | 90 x 100 | **PKY32F733** | - |
| | | | 3P + N + T | 90 x 100 | **PKY32F735** | - |
| Household NF sockets | 10 to 16 | 250 | 2P + T | 65 x 85 | **81140** | - |
| Household Schuko sockets | 10 to 16 | 250 | 2P + T | 65 x 85 | **81141** | - |
| Screw-on plate | For blanking of unused openings | | | | **13137** | 0.10 |
| | For adapting 65 x 85 mm power-socket bases | | | | **13136** | 0.09 |

*(5) The sum of currents in the 2 sockets installed on the tap-off unit ≤ 32 A.*

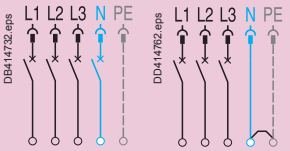
# 250 and 400 A tap-off units for measurements and metering

## Tap-off units for measurements and metering




**KSB●●●DC●TRE**

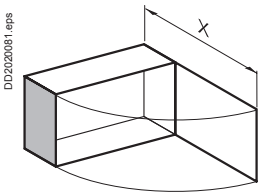
The cover of the tap-off unit may be opened only when the circuit breaker is in the On / Off position.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) TNC |
|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) TNC |
| Tap-off polarity | | 3L + N + PE (2) / 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |  |



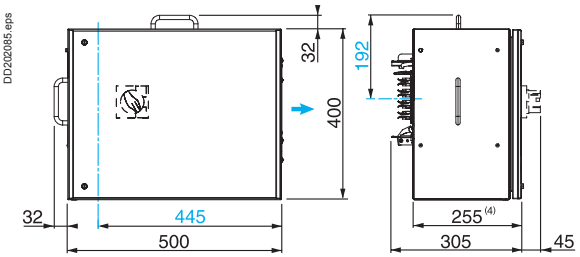
| Rating (A) | Type of circuit breaker | Connection | Max. size (mm²) | | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 250 | NSX 250 Type N, H or L Rotary handle 29338 | NSX CT block | 150 | 150 | ISO 40 max. | **KSB250DC4TRE** | **KSB250DC5TRE** | 13.50 |
| 400 | NSX 400 Type N, H or L Rotary handle 32598 | NSX CT block | 240 | 240 | ISO 50 max. | **KSB400DC4TRE** | **KSB400DC5TRE** | 19.50 |

*(1) The neutral must be protected or not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

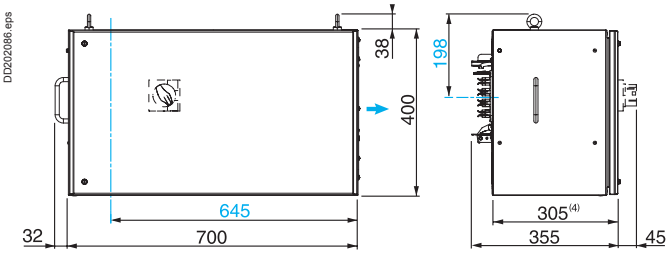



X = 726.5 (KSB250DC●TRE)
X = 976.5 (KSB400DC●TRE)

**KSB250DC●TRE**



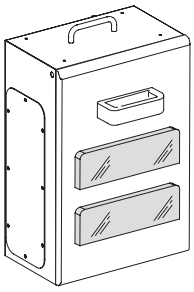

**KSB400DC●TRE**




Cable exit
Centre line of tap-off outlets

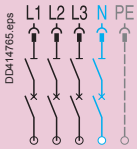
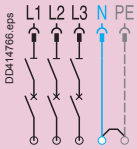
*(4) Protruding*

## Disconnector units



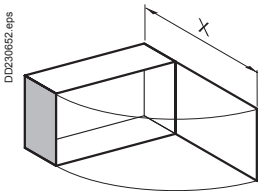

**KSB160SM424**

Disconnection by opening the tap-off unit door.

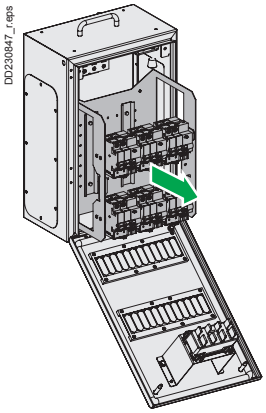
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |   |   |

| Rating (A) | Number of 9mm mod. | Number of 18mm (3) mod. | Connection | Max. cross-section ($mm^2$) | | Cable gland (4) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Flexible | Rigid | | | | |
| 160 | 48 | 24 | Lugs | 16 | Not used | ISO 50 max. | **KSB160SM424** | **KSB160SM524** | 10.69 |

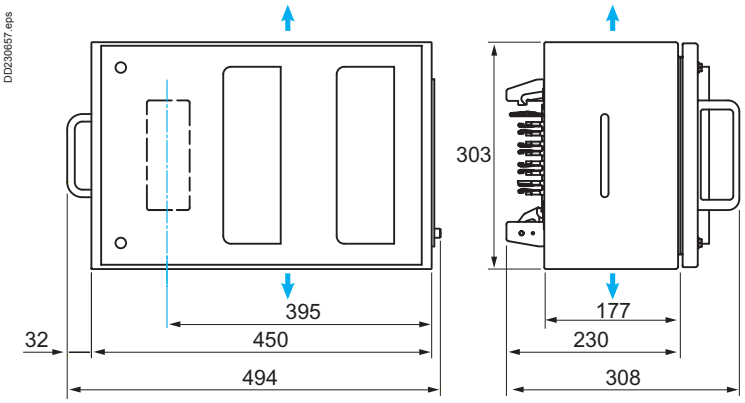
*(1) The neutral must be protected or not distributed (3L + PE) for the IT earthing system.*
*(2) Also suitable for 3L + PE tap-off (N not distributed).*
*(3) Supplied with blanking plate 1 x 5 divisible (8 modules) or 2 x 5 divisible (12 modules).*
*(4) Max. diameter for a multipole cable.*




*X = 650*

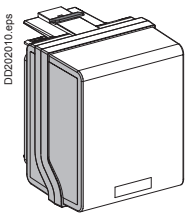



**KSB160SM424**



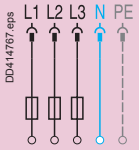
# 32 to 100 A tap-off units cylindrical fuses

## Tap-off units for cylindrical fuses




**KSB32CF5**

Disconnection by unplugging the tap-off unit.

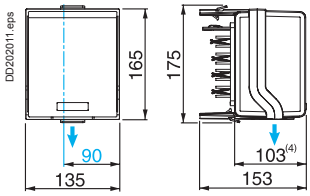
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. fuse protection) | |  |



| Rating (A) | For fuses (not supplied) | Connection | Max. size (mm²) Flexible | Max. size (mm²) Rigid | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| 32 | NF 10 x 38<br>Type gG: 25 A max.<br>Type aM: 32 A max. | Cable clamp terminals | 6 | 10 | ISO 32 max. | **KSB32CF5** | 0.60 |

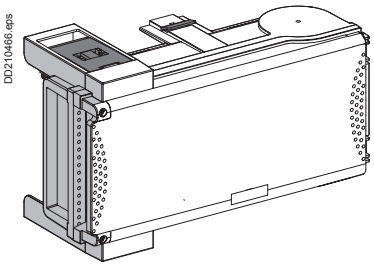
*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*

**KSB32CF5**



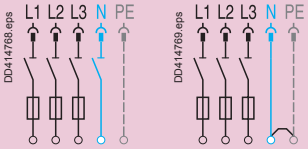

*Cable exit*
*Centre line of tap-off outlets*
*(4) Protruding*

## Tap-off units with isolator for cylindrical fuses




**KSB●●●SF**

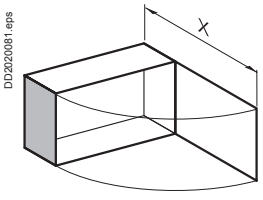
Disconnection by opening the tap-off unit cover.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |  | |



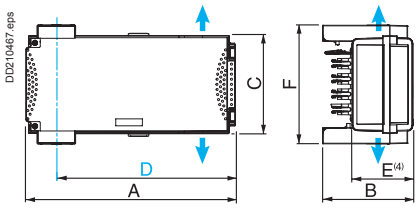
| Rating (A) | For fuses (not supplied) | Connection | Max. size (mm²) Flexible | Max. size (mm²) Rigid | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| 50 | NF 14 x 51<br>Type gG, 50 A max.<br>Type aM, 50 A max. | Cable clamp terminals | 25 | 25 | ISO 50 max. | **KSB50SF4** | **KSB50SF5** | 2.40 |
| 100 | NF 22 x 58<br>Type gG, 100 A max.<br>Type aM, 100 A max. | Copper cable lugs | 50 | 50 | ISO 63 max. | **KSB100SF4** | **KSB100SF5** | 5.00 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*




X = 432.5 (KSB50SF●)
X = 545.5 (KSB100SF●)

**KSB50SF●, KSB100SF●**

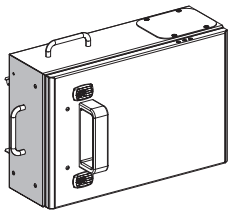



*Cable exit*
*Centre line of tap-off outlets*
*(4) Protruding*

| Dim. | 50 A | 100 A |
|---|---|---|
| A | 356 | 444 |
| B | 153 | 178 |
| C | 167 | 202 |
| D | 309 | 397 |
| E | 103 | 128 |
| F | 202 | 220 |

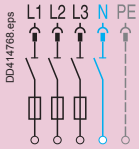
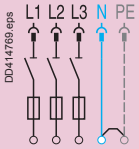
# 100 to 400 A tap-off units for NF fuses

## Tap-off units with isolator for blade-type fuses



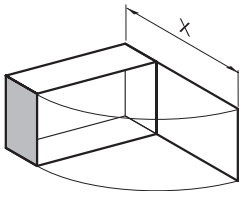

**KSB160SE●**
**KSB250SE●**
**KSB400SE●**

Disconnection by opening the tap-off unit cover.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |   |   |

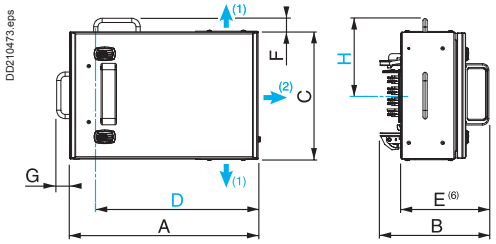
| Rating (A) | For blade-type fuses (not supplied) | Connection | Max. size ($mm^2$) Flexible | Max. size ($mm^2$) Rigid | Cable gland (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| 100 | Size 00<br>Type gG, 100 A max.<br>Type aM, 100 A max. | Copper cable lugs | 35 | 50 | ISO 63 (3) max. | **KSB100SE4** (5) | **KSB100SE5** (5) | 5.00 |
| 160 | Size 00<br>Type gG, 160 A max.<br>Type aM, 160 A max. | Copper cable lugs | 70 | 70 | ISO 32 (4) max. | **KSB160SE4** | **KSB160SE5** | 11.00 |
| | Size 0<br>Type gG, 160 A max.<br>Type aM, 160 A max. | Copper cable lugs | 70 | 70 | ISO 32 (4) max. | **KSB160SF4** | **KSB160SF5** | 11.00 |
| 250 | Size 1<br>Type gG, 250 A max.<br>Type aM, 250 A max. | Copper cable lugs | 150 | 150 | ISO 40 (4) max. | **KSB250SE4** | **KSB250SE5** | 20.00 |
| 400 | Size 2<br>Type gG, 400 A max.<br>Type aM, 400 A max. | Copper cable lugs | 240 | 240 | ISO 50 (4) max. | **KSB400SE4** | **KSB400SE5** | 29.20 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a unipolar cable.*
*(4) Cable gland for multipolar cable only.*
*(5) For 100 A dimensions, see "Tap-off units with insulators for cylindrical fuses", page 52, cat. no. **KSB100SF●**.*




X = 577.5 (KSB160S●●)
X = 777 (KSB250SE●)
X = 855 (KSB400SE●)

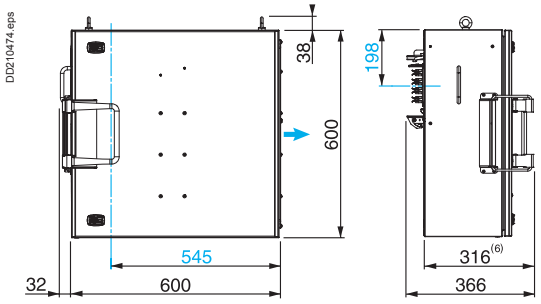
**KSB160S●●, KSB250SE●**




| Dim. | 160 A | 250 A |
|---|---|---|
| A | 450 | 600 |
| B | 257 | 308 |
| C | 300 | 400 |
| D | 395 | 548 |
| E | 207 | 258 |
| F | 032 | 032 |
| G | 032 | 032 |
| H | 182 | 192 |

(1) *Cable exit of* **KSB160S●●**
(2) *Cable exit of* **KSB250SE●**
*Centre line of tap-off outlets*
*(6) Protruding*

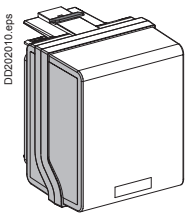
**KSB400SE●**




*Cable exit*
*Centre line of tap-off outlets*
*(6) Protruding*

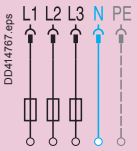
# 16 to 63 A tap-off units for DIN fuses

## Tap-off units for screw-mounted type fuses




**KSB16CN5**

Disconnection by unplugging the tap-off unit.

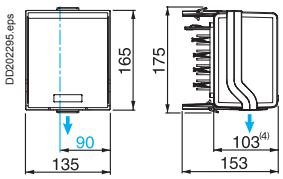
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. fuse protection) | |  |



| Rating (A) | For fuses (not supplied) | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 16 | Neozed E14 | Tunnel terminals | 6 | 10 | ISO 32 max. | **KSB16CN5** | 0.60 |

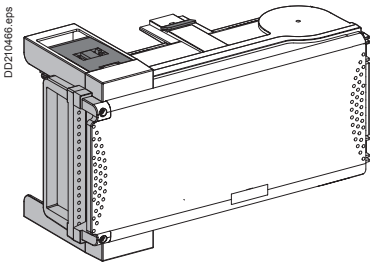
*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*

**KSB16CN5**



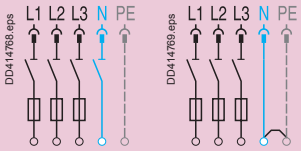

*Cable exit*
*Centre line of tap-off outlets*
*(4) Protruding*

## Tap-off units with isolator for screws-type fuses




**KSB●●S●●**

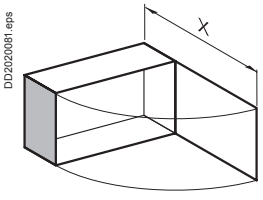
Disconnection by opening the tap-off unit cover.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) TNC | |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) TNC | |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |  | |



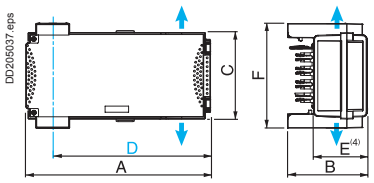
| Rating (A) | For fuses (not supplied) | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 25 | Diazed E27 | Tunnel terminals | 25 | 25 | ISO 50 max. | **KSB25SD4** | **KSB25SD5** | 2.40 |
| 50 | Neozed E18 | Tunnel terminals | 25 | 25 | ISO 50 max. | **KSB50SN4** | **KSB50SN5** | 2.40 |
| 63 | Diazed E33 | Tunnel terminals | 25 | 25 | ISO 63 max. | **KSB63SD4** | **KSB63SD5** | 2.40 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*




X = 432.5 (KSB25SD●, KSB50SN●)
X = 545.5 (KSB63SD●)

**KSB●●S●●**

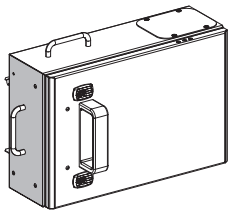



*Cable exit*
*Centre line of tap-off outlets*
*(4) Protruding*

| Dim. | 25 and 50 A | 63 A |
|---|---|---|
| A | 356 | 444 |
| B | 153 | 178 |
| C | 167 | 202 |
| D | 309 | 397 |
| E | 103 | 128 |
| F | 202 | 220 |

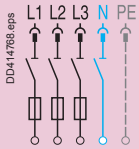
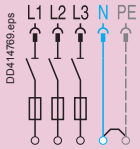
# 100 to 400 A tap-off units for DIN fuses

## Tap-off units with isolator for blade-type fuses



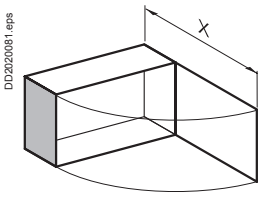

**KSB160SE●**
**KSB250SE●**

Disconnection by opening the tap-off unit cover.

| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
|---|---|---|---|
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |   |   |

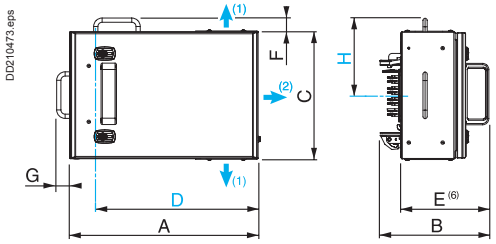
| Rating (A) | For blade-type fuses (not supplied) | Connection | Max. size ($mm^2$) | | Cable gland (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 100 | Size 00<br>Type gG, 100 A max.<br>Type aM, 100 A max. | Copper cable lugs | 35 | 50 | ISO 63 (3) max. | **KSB100SE4** (5) | **KSB100SE5** (5) | 5.00 |
| 160 | Size 00<br>Type gG, 160 A max.<br>Type aM, 160 A max. | Copper cable lugs | 70 | 70 | ISO 32 (4) max. | **KSB160SE4** | **KSB160SE5** | 11.00 |
| 250 | Size 1<br>Type gG, 250 A max.<br>Type aM, 250 A max. | Copper cable lugs | 150 | 150 | ISO 40 (4) max. | **KSB250SE4** | **KSB250SE5** | 20.00 |
| 400 | Size 2<br>Type gG, 400 A max.<br>Type aM, 250 A max. | Copper cable lugs | 240 | 240 | ISO 50 (4) max. | **KSB400SE4** | **KSB400SE5** | 29.20 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a unipolar cable.*
*(4) Cable gland for multipolar cable only.*
*(5) For 100 A dimensions, see "Tap-off units with insulators for cylindrical fuses", page 52, cat. no. **KSB100SF●**.*




X = 577.5 (KSB160SE●)
X = 777 (KSB250SE●)
X = 855 (KSB400SE●)

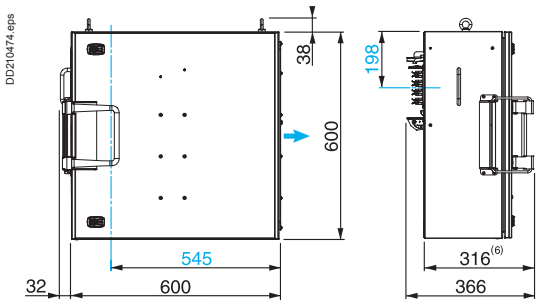
**KSB160SE●, KSB250SE●**




| Dim. | 160 A | 250 A |
|---|---|---|
| A | 450 | 600 |
| B | 257 | 308 |
| C | 300 | 400 |
| D | 395 | 548 |
| E | 207 | 258 |
| F | 032 | 032 |
| G | 032 | 032 |
| H | 182 | 192 |

(1) *Cable exit of **KSB160SE●***
(2) *Cable exit of **KSB250SE●***
*Centre line of tap-off outlets*
*(6) Protruding*

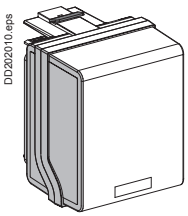
**KSB400SE●**




*Cable exit*
*Centre line of tap-off outlets*
*(6) Protruding*

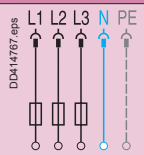
# 20 to 160 A tap-off units for BS fuses

## Tap-off units for screw-mounted type fuses




**KSB20CG5**

Disconnection by unplugging the tap-off unit.

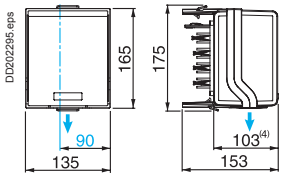
| | |
|---|---|
| Earthing system arrangement | Busbar trunking / Tap-off unit: TT-TNS-TNC-IT (1) / TT-TNS-TNS-IT (1) |
| Tap-off polarity | 3L + N + PE (2) |
| Tap-off diagram (e.g. fuse protection) |  |



| Rating (A) | For fuses (not supplied) | Connection | Max. size (mm²) Flexible | Max. size (mm²) Rigid | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| 20 | BS88 A1 | Cable clamp terminals | 6 | 10 | ISO 32 max. | **KSB20CG5** | 0.60 |

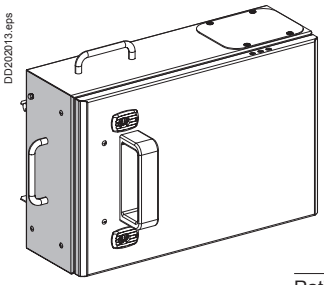
*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*

**KSB20CG5**



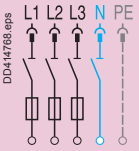

*Cable exit*
*Centre line of tap-off outlets*
*(4) Protruding*

## Tap-off units with isolator for screw-mounted type fuses




**KSB160SG4**

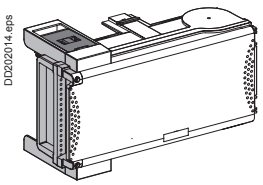
Disconnection by opening the tap-off unit cover.

| | |
|---|---|
| Earthing system arrangement | Busbar trunking / Tap-off unit: TT-TNS-TNC-IT (1) / TT-TNS-TNS-IT (1) |
| Tap-off polarity | 3L + N + PE (2) |
| Tap-off diagram (e.g. fuse protection) |  |



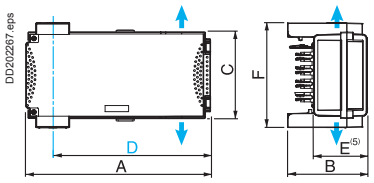
| Rating (A) | For fuses (not supplied) | Connection | Max. size Flexible or rigid | Cable gland (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|
| 32 | BS88 A1 | Cable clamp terminals | 25 | ISO 50 max.(3) | **KSB32SG4** | 2.40 |
| 80 | BS88 A1 ou A3 | Copper cable lugs | 50 | ISO 63 max.(3) or ISO 20 max.(4) | **KSB80SG4** | 5.00 |
| 160 | BS88 B1 ou B2 | Copper cable lugs | 50 | ISO 25 max.(4) | **KSB160SG4** | 11.00 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed).*
*(3) Maximum diameter for a multipolar cable.*
*(4) Maximum diameter for a unipolar cable.*

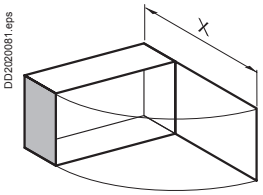



**KSB●●SG4**

**KSB32SG4, KSB80SG4**

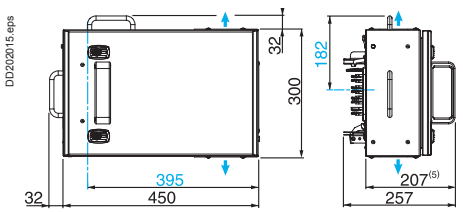



| Dim. | 32 A | 80 A |
|---|---|---|
| A | 356 | 444 |
| B | 153 | 178 |
| C | 167 | 202 |
| D | 309 | 397 |
| E | 103 | 128 |
| F | 202 | 220 |




X = 432.5 (KSB32SG4)
X = 545.5 (KSB80SG4)
X = 577.5 (KSB160SG4)

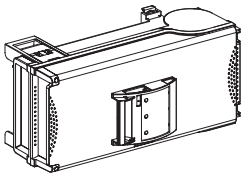
**KSB160SG4**



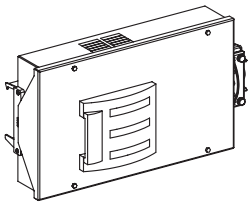

*Cable exit*
*Centre line of tap-off outlets*
*(5) Protruding*

# 125, 250 and 400 A tap-off units for switch fuse disconnectors

## IP30 tap-off units for fuses

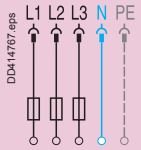



**KSB125HD5**




**KSB●●HD502**

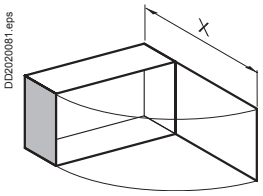
Disconnection by unplugging the tap-off unit, switch fuse disconnector mounted without fuse.

| | | |
|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) |
| | Tap-off unit | TT-TNS-TNS-IT (1) |
| Tap-off polarity | | 3L + N + PE (2) |
| Tap-off diagram (e.g. fuse protection) | |  |



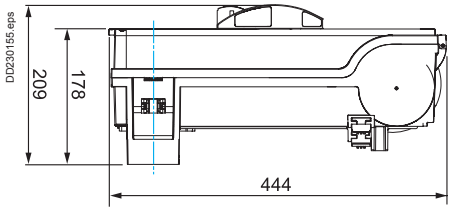
| Rating (A) | For fuses (not supplied) | Connection | Max. size ($mm^2$) | | Cable gland (3) (not supplied) | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | |
| 125 | NHL 00 IN U5U5 Type 00 | Cable clamp terminals | 50 | 50 | ISO 63 max. | **KSB125HD5** | 2.00 |
| 250 | NHL 1 IN U5U5 Type 1 | Cable clamp terminals | 185 | 185 | - | **KSB25HD502** | 9,00 |
| 400 | NHL 00 IN U5U5 Type 2 | Cable clamp terminals | 240 | 240 | - | **KSB40HD502** | 9,00 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a multipolar cable.*

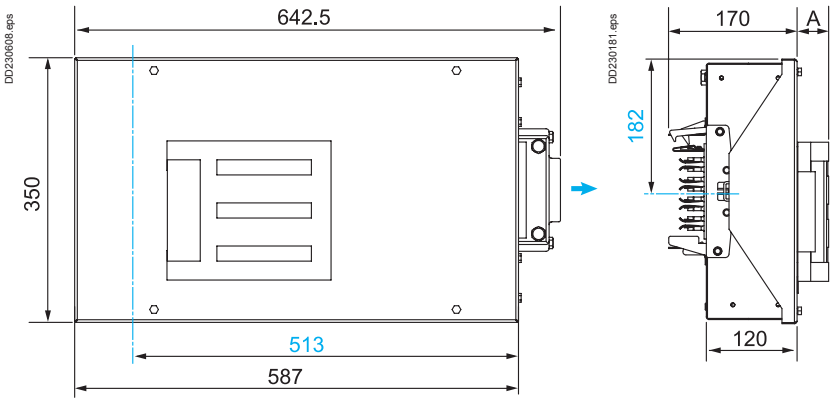



X = 622.5 (KSB125HD5)
X = 763 (KSB●●HD502)

**KSB125HD5**




**KSB●●HD502**

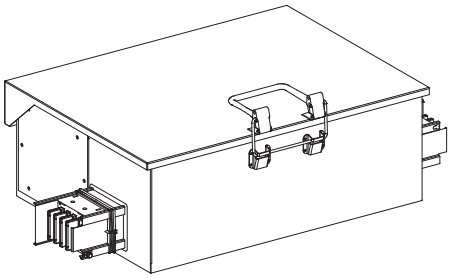



| Dim. | KSB25HD502 | KSB40HD502 |
|---|---|---|
| A | 42 | 50 |

*Cable exit*
*Centre line of tap-off outlets*

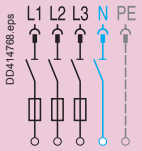
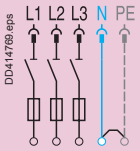
# 630 A tap-off units for fuses

## Tap-off units with isolator for fuses




**KSB630SE●**

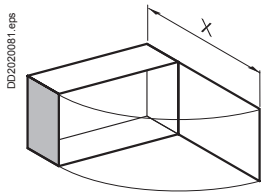
Disconnection by opening the tap-off unit cover.
Assembly on 500 to 1000 A straight components only, supplied with two end covers and a KSA1000ZJ4 junction block compatible with 800 and 1000 A components.

| | | | |
|---|---|---|---|
| Earthing system arrangement | Busbar trunking | TT-TNS-TNC-IT (1) | TNC |
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. fuse protection) | |  |  |



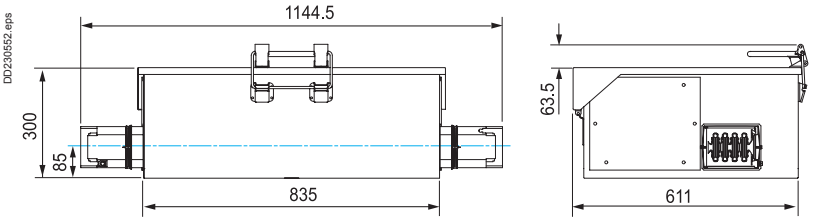
| Rating (A) | For fuses (not supplied) | Connection | Max. size ($mm^2$) | | Cable gland (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| | | | Flexible | Rigid | | | | |
| 630 (4) | Size 3 | Copper cable lugs | 2 x 240 | 2 x 240 | ISO 40 (3) max. | **KSB630SE4** | **KSB630SE5** | 59,00 |

*(1) The neutral must be not distributed (3L + PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible only if N not distributed).*
*(3) Maximum diameter for a unipolar cable.*
*(4) Derating coefficient to apply: 0.9.*




X = 1106.5

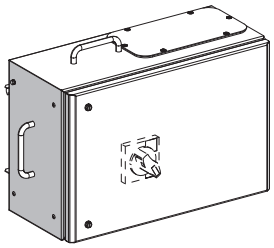
**KSB630SE●**




*Centre line of the busbar trunking*

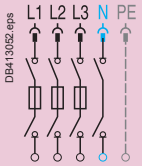
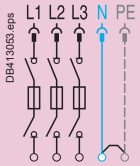
# 250 to 400 A tap-off units for Fupact INF switch-disconnector fuses

## Tap-off units for Fupact INF, fixed, front-connected switch-disconnector fuses



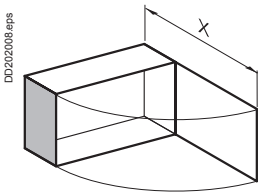

**KSB ●●●SDF●**

The cover of the tap-off unit may be opened only when the INF is in the Off position.

| | | | |
|---|---|---|---|
| Earthing system arrangement | Busbar trunking& | TT-TNS-TNC-IT (1) | TNC |
| | Tap-off unit | TT-TNS-TNS-IT (1) | TNC |
| Tap-off polarity | | 3L + N + PE (2) | 3L + PEN |
| Tap-off diagram (e.g. circuit-breaker protection) | |   |   |

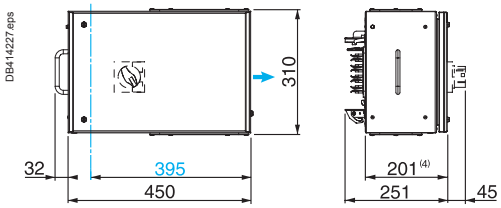
| Rating (A) | Type of Fupact (not supplied) | Connection | Max. size ($mm^2$) Flexible | Rigid | Cable gland (3) (not supplied) | Cat. no. | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|---|---|---|
| 160 | INFD160 or INFB250 with extended rotary handle | INF | 70 | 70 | ISO 32 max. | **KSB160SDF4** | **KSB160SDF5** | 9,00 |
| 250 | INFD250 or INFB250 with extended rotary handle 49619 | INF | 70 | 150 | ISO 32 max. | **KSB250SDF4** | **KSB250SDF5** | 12.50 |
| 400 | INFD400 or INFB400 with extended rotary handle LV480540 | INF | 150 | 240 | ISO 40 max. | **KSB400SDF4** | **KSB400SDF5** | 18.00 |

*(1) The neutral must be protected or not distributed (3L+PE) for the IT system.*
*(2) Also suitable for tap-off unit 3L + PE (N not distributed, IT system also possible).*
*(3) Maximum diameter by unipolar cable.*

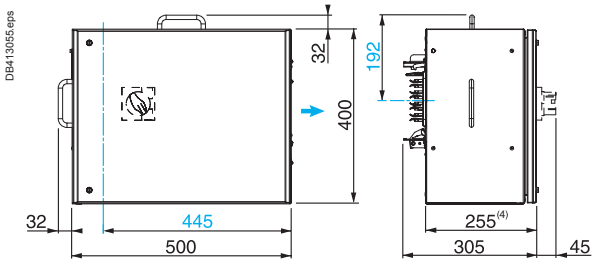



X = 577.5 (**KSB160SDF●**)
X = 726.5 (**KSB250SDF●**)
X = 976.5 (**KSB400SDF●**)

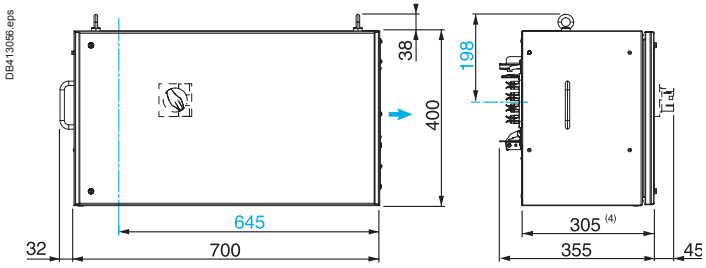
**KSB160SDF●**




**KSB250SDF●**




**KSB400SDF●**




Cable exit
Centre line of tap-off outlets

*(4) Protruding.*

# Accessories for tap-off units

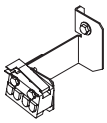
## For all tap-off units for modular devices

| Designation | Description | Cat. no. unitaire | Weight (kg) |
|---|---|---|---|
| Modular blanking plat | Divisible set of 10 x 5 | **13940** | 0.08 |
| Adhesive label (1) | Set of 12 label-holders (H = 24 mm - L = 180 mm) | **08905** | 0.50 |
| | Set of 12 labels-holders (H = 24 mm - L = 432 mm) | **08903** | 0.50 |
| | Set of 12 divisible labels-holders (H = 24 mm - L = 650 mm) | **08907** | 0.50 |

*(1) Self-adhevise support complete with transparent cover and paper label.*

## For sheet-metal tap-off units

DB414462.eps



| Designation | For tap-off unit | Order in multiple of | Cat. no. | Weight (kg) |
|---|---|---|---|---|
| Cover contact (break before opening) | **KSB100S● to KSB400S●** | 1 | **KSB400ZC1** | 0.03 |

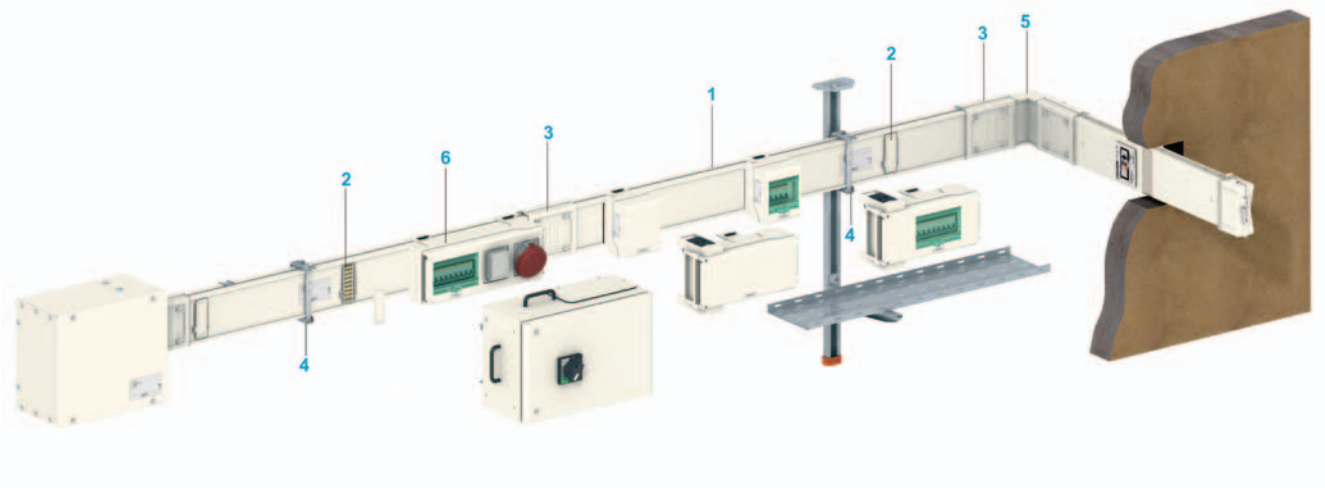
## FL21 gland plates

| Designation | Rating (A) | Cat. no. of tap-off units | No. of holes of the gland plates | Cat. no. | Weight (kg) |
|---|---|---|---|---|---|
| For tap-off units | 160 | **KSB160SF●** | 1 | **KSB160SFZFL21** | 0.20 |
| | | **KSB160DC●** | 1 | | 0.20 |
| | | **KSB160DD●** | 1 | | 0.20 |
| | 250 | **KSB250SF●** | 1 | **KSB250DCZFL21** | 0.30 |
| | | **KSB250DC●** | 1 | | 0.30 |
| | | **KSB250DD●** | 1 | | 0.30 |
| | 400 | **KSB400SF●** | 2 | **KSB400DCZFL21** | 0.40 |
| | | **KSB400DC●** | 2 | | 0.40 |
| | | **KSB400DD●** | 2 | | 0.40 |

# Characteristics
## Contents

# Technical specifications
## Horizontal trunking

PD202340.eps




Complies with standards IEC 61439-6.
Complies with sprinkler tests, guaranteeing operation under vertically and horizontally sprayed water for 50 minutes.

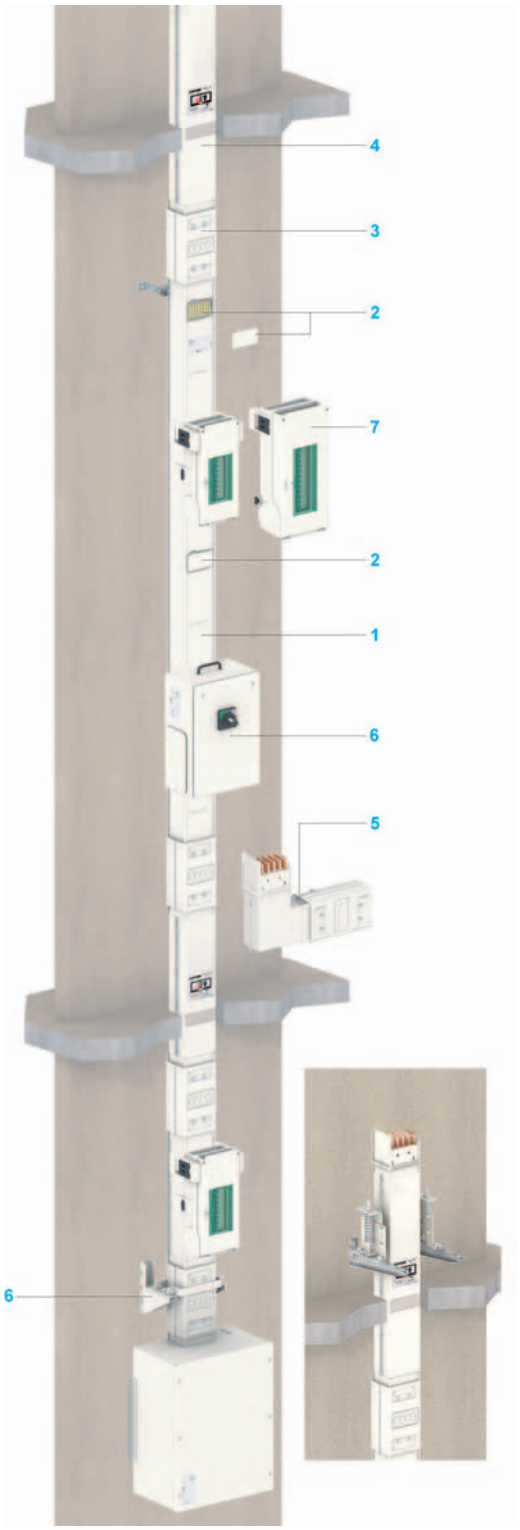
Degree of protection: IP55.
Number of live conductors: 4.
Rated insulation voltage: 690 V.
Rated current (Inc): 160 A, 250 A, 400 A, 630 A, 800 A.
The cross-sectional area of the protective conductor is at least 50 % that of the phases.

**Fire resistance:**
■ fire barriers as per standard ISO 834 (DIN 4102-part 9) for passages through partitions.
■ resistant to flame propagation in compliance with standard IEC 60332 - part 3.
■ materials resistant to abnormal heat (glow-wire test as per IEC 60695-2).

**All plastic components are halogen free.**

■ The enclosure (1), made of sheet steel, galvanised and pre-lacquered RAL 9001 white.
■ The four copper conductors are mounted on fibreglass reinforced polyester insulators.
■ The straight lengths have a tap-off unit (2) every metre on both sides.
The tap-off outlets are equipped with automatic shutters that avoid accidental contact with live parts. The protective conductor is electrically connected to the enclosure at each jointing unit.
■ Electrical contact between two components is ensured by flexible contacts designed to adapt to the difference in expansion between the conductors and the enclosure.
It is possible to check visually that the electrical contact is effective.
The mechanical junction between two components is ensured by four captive screws.
The jointing unit (3) is maintenance free.
■ The rigidity of the straight lengths is sufficient that fixing points (4) are required only every three metres (excepting special conditions).
■ Special components (5) are available to change direction or avoid obstacles.
■ The tap-off units (6) have the following characteristics:
□ connection and disconnection are possible only with the cover open
□ the contact of the protective conductor ensures automatic opening of the shutters and feeds the tap-off unit
□ there is no access to live parts when the cover of the tap-off unit is open (no finger access, IPxxD)
□ when the tap-off unit is plugged in, the earthing contact connects first, followed by the phases
□ it is not possible to close the cover before the tap-off unit is mechanically locked on the trunking, tap-off units can be equipped with fuses, modular devices or moulded case circuit breakers.
■ The electrical contacts are made of silver-plated copper and copper used is ETP 99.9 % purity.

PD202341_r1.eps




Complies with standards IEC 61439-2.
Complies with sprinkler tests, guaranteeing operation under vertically and horizontally sprayed water for 50 minutes.

Degree of protection: IP55.
Number of live conductors: 4.
Rated insulation voltage: 690 V.
Rated current (Inc): 160 A, 250 A, 400 A, 630 A, 800 A.
The cross-sectional area of the protective conductor is at least 50 % that of the phases.

**Fire resistance:**
■ fire barriers as per standard ISO 834 (DIN 4102-part 9) for passages through partitions (slabs for exemple).
■ resistant to flame propagation in compliance with standard IEC 60332 - part 3.
■ materials resistant to abnormal heat (glow-wire test as per IEC 60695-2).

**All plastic components are halogen free.**

■ The enclosure (1), made of sheet steel, galvanised and pre-lacquered RAL 9001 white.
■ The four copper conductors are mounted on fibreglass reinforced polyester insulators.
■ The straight lengths have a tap-off unit (2) every 0.5 metre on one side. There are four tap-off units per floor for floor heights between 3.5 and 4.8 metres, or three tap-off units per floor for floor heights less than 3.5 metres. The tap-off outlets are equipped with automatic shutters that avoid accidental contact with live parts.
The protective conductor is electrically connected to the enclosure at each jointing unit.
■ Electrical contact between two components is ensured by flexible contacts designed to adapt to the difference in expansion between the conductors and the enclosure. It is possible to check visually that the electrical contact is effective.
The mechanical junction between two components is ensured by four captive screws.
The jointing unit (3) is maintenance free.
■ A fire barrier (4) can be installed when the riser passes through a slab to avoid any risk of fire propagation from one floor to another.
Two-hour fire resistance (A120) is provided in compliance with standard ISO834 (DIN 41-2-part 9).
■ Special components (5) are available to change direction or avoid obstacles.
■ The riser can be maintained by a special bottom support (6) or a spring-based fixing device on each floor of the building (depending on the height of the building).
■ The tap-off units (7) have the following characteristics:
□ connection and disconnection are possible only with the cover open
□ the contact of the protective conductor ensures automatic opening of the shutters and feeds the tap-off unit
□ there is no access to live parts when the cover of the tap-off unit is open (no finger access, IPxxD)
□ when the tap-off unit is plugged in, the earthing contact connects first, followed by the phases
□ it is not possible to close the cover before the tap-off unit is mechanically locked on the trunking, tap-off units can be equipped with modular devices or moulded case circuit breakers.
■ The electrical contacts are made of silver-plated copper and copper used is ETP 99.9 % purity.

# Electrical characteristics
## From 160 to 800 A
## IP55
## Ue = 230...690 V

## Run component characteristics

| Rating of trunking (A) | | | | KS | 160 | 250 | 400 | 630 | 800 |
|---|---|---|---|---|---|---|---|---|---|
| **General characteristics** | | | | | | | | | |
| Compliance with standards | | | | | IEC/EN 61439-6 | | | | |
| Degree of protection | | | IP | | 55 | 55 | 55 | 55 | 55 |
| Mechanical impacts | | | IK | | 08 | 08 | 08 | 08 | 08 |
| Rated current at an ambient temperature of 35 °C | | | $I_{nc}$ | **A** | 160 | 250 | 400 | 630 | 800 |
| Rated insulation voltage | | | $U_i$ | **V** | 690 | 690 | 690 | 690 | 690 |
| Rated operational voltage | | | $U_e$ | **V** | 690 | 690 | 690 | 690 | 690 |
| Rated impulse voltage | | | $U_{imp}$ | **kV** | 8 | 8 | 8 | 8 | 8 |
| Rated frequency | | | f | **Hz** | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 |
| **Conductor characteristics** | | | | | | | | | |
| **Phase conductors** | | | | | | | | | |
| Mean resistance at an ambient temperature of 20 °C | | | $R_{20}$ | **mΩ/m** | 0.64 | 0.2 | 0.11 | 0.06 | 0.04 |
| Mean resistance at an ambient temperature of 20 °C | | | $Z_{20}$ | **mΩ/m** | 0.66 | 0.20 | 0.11 | 0.06 | 0.04 |
| Mean resistance at $I_{nc}$ and 35 °C | | | $R_1$ | **mΩ/m** | 0.68 | 0.21 | 0.12 | 0.06 | 0.04 |
| Mean reactance at $I_{nc}$, 35 °C and 50 Hz | | | $X_1$ | **mΩ/m** | 0.16 | 0.15 | 0.14 | 0.07 | 0.07 |
| Mean impedance at $I_{nc}$, 35 °C and 50 Hz | | | $Z_1$ | **mΩ/m** | 0.69 | 0.26 | 0.18 | 0.09 | 0.08 |
| **Protective conductor (PE)** | | | | | | | | | |
| Mean resistance at an ambient temperature of 20 °C | | | | **mΩ/m** | 0.42 | 0.35 | 0.19 | 0.07 | 0.07 |
| **Fault loop characteristics** | | | | | | | | | |
| Symmetrical components method | Ph/N at 20 °C | Mean resistance | $R_{20\ ph/N}$ | **mΩ/m** | 2.66 | 0.90 | 0.49 | 0.30 | 0.20 |
| | | Mean reactance | $X_{20\ ph/N}$ | **mΩ/m** | 0.79 | 0.69 | 0.60 | 0.33 | 0.31 |
| | | Mean impedance | $Z_{20\ ph/N}$ | **mΩ/m** | 2.77 | 1.13 | 0.77 | 0.44 | 0.37 |
| | Ph/PE at 20 °C | Mean resistance | $R_{20\ ph/N}$ | **mΩ/m** | 1.61 | 1.17 | 1.06 | 0.26 | 0.23 |
| | | Mean reactance | $X_{20\ ph/N}$ | **mΩ/m** | 0.88 | 0.76 | 0.67 | 0.51 | 0.48 |
| | | Mean impedance | $Z_{20\ ph/N}$ | **mΩ/m** | 1.84 | 1.39 | 1.26 | 0.57 | 0.54 |
| Impedance method | Ph/N at 35 °C | Mean resistance | $R_{35\ ph/N}$ | **mΩ/m** | 2.81 | 0.95 | 0.51 | 0.31 | 0.21 |
| | | Mean reactance | $X_{35\ ph/N}$ | **mΩ/m** | 0.79 | 0.69 | 0.60 | 0.33 | 0.31 |
| | | Mean impedance | $Z_{35\ ph/N}$ | **mΩ/m** | 2.86 | 1.17 | 0.79 | 0.45 | 0.38 |
| | Ph/PE at 35 °C | Mean resistance | $R_{35\ ph/N}$ | **mΩ/m** | 1.69 | 1.23 | 1.12 | 0.27 | 0.24 |
| | | Mean reactance | $X_{35\ ph/N}$ | **mΩ/m** | 0.88 | 0.76 | 0.67 | 0.51 | 0.48 |
| | | Mean impedance | $Z_{35\ ph/N}$ | **mΩ/m** | 1.91 | 1.45 | 1.31 | 0.58 | 0.54 |
| | At 20 °C | Mean resistance Ph/Ph | $R_{b0\ ph/ph}$ | **mΩ/m** | 1.287 | 0.406 | 0.213 | 0.118 | 0.079 |
| | | Mean resistance Ph/N | $R_{b0\ ph/N}$ | **mΩ/m** | 1.291 | 0.419 | 0.222 | 0.126 | 0.088 |
| | | Mean resistance Ph/PE | $R_{b0\ ph/PE}$ | **mΩ/m** | 0.974 | 0.529 | 0.427 | 0.126 | 0.106 |
| | For $I_{nc}$ at 35 °C | Mean resistance Ph/Ph | $R_{b0\ ph/ph}$ | **mΩ/m** | 1.363 | 0.430 | 0.225 | 0.125 | 0.083 |
| | | Mean resistance Ph/N | $R_{b0\ ph/N}$ | **mΩ/m** | 1.367 | 0.443 | 0.235 | 0.134 | 0.093 |
| | | Mean resistance Ph/PE | $R_{b0\ ph/PE}$ | **mΩ/m** | 1.032 | 0.560 | 0.452 | 0.134 | 0.112 |
| | For $I_{nc}$ at 35 °C and 50 Hz | Mean reactance Ph/Ph | $X_{b\ ph/ph}$ | **mΩ/m** | 0.294 | 0.292 | 0.269 | 0.133 | 0.135 |
| | | Mean reactance Ph/N | $X_{b\ ph/N}$ | **mΩ/m** | 0.416 | 0.393 | 0.355 | 0.190 | 0.190 |
| | | Mean reactance Ph/PE | $X_{b\ ph/PE}$ | **mΩ/m** | 0.483 | 0.445 | 0.384 | 0.260 | 0.252 |
| **Other characteristics** | | | | | | | | | |
| **Short-circuit withstand capacity** | | | | | | | | | |
| Rated peak withstand current | | | $I_{pk}$ | **kA** | 22 | 28 | 49.2 | 67.5 | 78.7 |
| Maximum thermal limit $I^2t$ (t = 1 s) | | | | **$10^6$ $A^2s$** | 20.2 | 100 | 354 | 1225 | 1758 |
| Rated short-time withstand current (t = 1 s) | | | $I_{cw}$ | **kA** | 4.45 | 10 | 18.8 | 32.1 | 37.4 |
| **Voltage drop** | | | | | | | | | |
| | | | Composite voltage drop (hot state) expressed in V/100 m/A (50 Hz) with the load uniformly distributed over the run. If the load is concentrated at one end of the run, the voltage drop is twice the value indicated in the table. | | | | | | |
| For a power factor of | | | 1 | **V/100 m/A** | 0.0667 | 0.0259 | 0.0184 | 0.0094 | 0.0083 |
| | | | 0.9 | **V/100 m/A** | 0.0666 | 0.0255 | 0.0179 | 0.0091 | 0.008 |
| | | | 0.8 | **V/100 m/A** | 0.0665 | 0.0254 | 0.0177 | 0.009 | 0.0079 |
| | | | 0.7 | **V/100 m/A** | 0.0665 | 0.0253 | 0.0176 | 0.009 | 0.0078 |
| **Radiated magnetic field** | | | | | | | | | |
| Radiated magnetic field strength 1 metre from the trunking | | | B | **µT** | 0.41 | 0.69 | 1.00 | 0.89 | 1.12 |
| **Product selection when harmonics are present (for details, see the "Special Applications" section)** | | | | | | | | | |
| Operational current as a function of 3rd harmonic content | | | THD ≤ 15 % | | 160 | 250 | 400 | 630 | 800 |
| | | | 15 % < THD ≤ 33 % | | 125 | 200 | 315 | 500 | 630 |
| | | | THD > 33 % | | 100 | 160 | 250 | 400 | 500 |

| **Permissible current as a function of ambient temperature** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ambient temperature | °C | < 35 | 35 | 40 | 45 | 50 | 55 |
| Coeficient K1 | **%** | 1 | 1 | 0.97 | 0.94 | 0.91 | 0.87 |

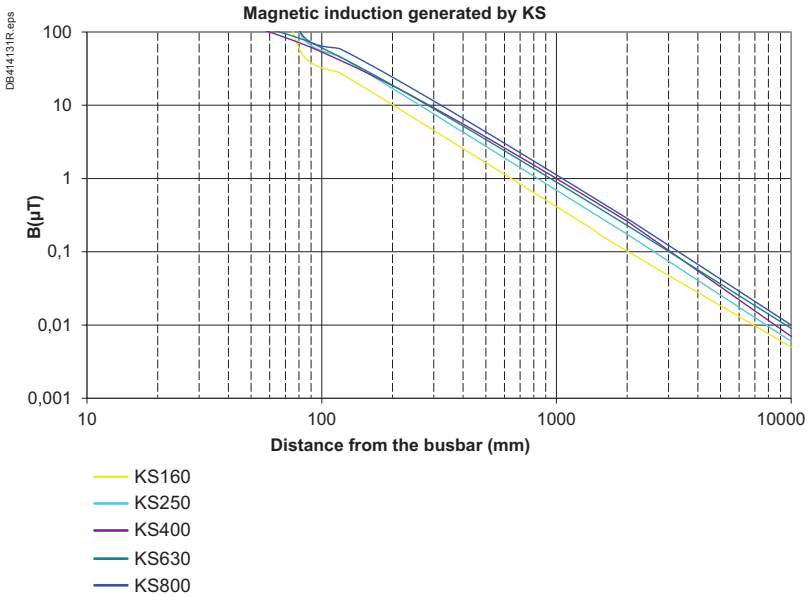
## Tap-off unit characteristics

| General characteristics | | | |
|---|---|---|---|
| Degree of protection | IP | | 55 |
| Mechanical impacts | IK | | 08 |
| Rated insulation voltage (1) | $U_i$ | **V** | 400, 500 depending on protective device |
| Rated operational voltage (1) | $U_e$ | **V** | 400, 500 depending on protective device |
| Rated impulse voltage | $U_{imp}$ | **kV** | 6.8 |
| Rated frequency | f | **Hz** | 50 / 60 |

*(1) For 690 V, please see your sales office.*

### Radiated electromagnetic fields

According to the WHO (World Health Organisation), exposure to radiated electromagnetic fields above 0.2 micro Tesla can be dangerous causing a risk of cancer over the long term. Some countries have standardised the limit:
Sweden = 0.2 µT, at a distance of 1 metre.
All electrical conductors generate a magnetic field, the strength of which is proportional to the distance between them. The Canalis busbar trunking concept (metal casing and conductors near together) helps to considerably reduce radiated electromagnetic fields.
In specific cases where particularly low values are required (computer rooms, hospitals, some offices), it is important to keep in mind the following:
■ the induction generated around 3-phase distribution. This is proportional to the current and the distance between the conductors, and inversely proportional to the square of the distance with respect to the busbar trunking and the screening effect of the case
■ the induction generated around busbar trunking. This is less than the induction generated around an equivalent cable distribution
■ Canalis' steel casing. This attenuates the induction more than an equivalent aluminium casing of the same thickness (screening effect)
■ the induction generated around busbar trunking with sandwiched bars. This is particularly low because of the short distance between the bars and the additional attenuation provided by the steel casing.



# Simplified design guide for power distribution

## Power distribution via Canalis

Except for the most extreme environments, there is no reason to hesitate. Canalis can be installed everywhere.

The procedure presented below describes the steps in creating a simple installation. For a detailed design study, it is necessary to use the suitable tools, approved by certification organisations and in compliance with local installation standards. ***Ecodial*** software, published by Schneider Electric, is perfectly suited to the task.

### Procedure

1 Identify external influences.
2 Layout the Canalis structure in the building according to the load locations.
3 Carry out a power sum.
4 Size the busbar trunking.

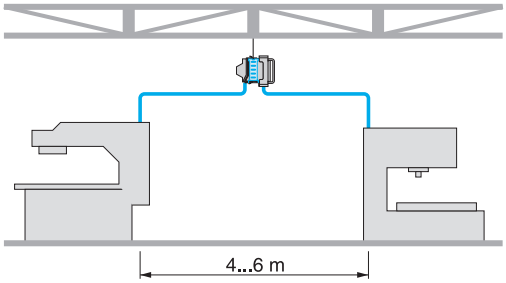
### 1 - Identify external influences

The ambient temperature, the presence of dust or condensation, etc. are all factors in defining the degree of protection for the room containing the electrical installation. Canalis prefabricated busbar trunking provides an IP55 degree of protection for indoor installations and can be installed on virtually all sites.

■ Examples:
□ mechanical workshops: IP32
□ warehouses: IP30
□ poultry farms: IP35
□ greenhouses: IP23
□ ...

### 2 - Layout of Canalis busbar trunking

DD210067.eps

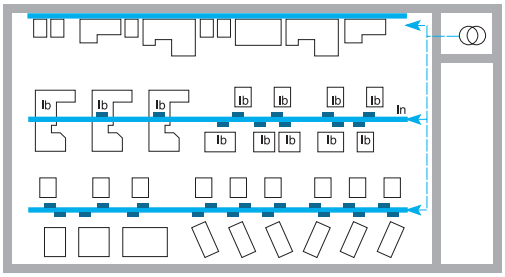



Layout of the distribution lines depends on load and source locations as well as trunking fixing possibilities.

■ A single distribution line can supply a zone four to six metres long.
■ Load protection is located in the tap-off units, as close as possible to the loads.
■ A single Canalis feeder can supply a set of loads with different power ratings.

### 3 - Power sum

DD414770.eps




Once the busbar trunking has been laid out, calculate the currents drawn by the Canalis lines.

**Calculation of the total operational current drawn by the line**
(In) is equal to the sum of the currents drawn by the loads (Ib): In = Σ Ib.
The loads do not all operate at the same time or continuously at full rated load, i.e. it is necessary to calculate the diversity coefficient ($K_S$): In = Σ (Ib x $K_S$).

**Diversity coefficient as a function of the number of loads**

| Application | Number of loads | KS coefficient |
|---|---|---|
| Lighting, heating | - | 1 |
| Distribution (Mechanical workshop) | 2...3 | 0.9 |
| | 4...5 | 0.8 |
| | 6...9 | 0.7 |
| | 10...40 | 0.6 |
| | 40 or more | 0.5 |

***Caution**. For industrial installations, remember to allow for changes in types and numbers of machines. Similar to a switchboard, a margin of 20 % is recommended: In = Σ Ib x $K_S$ x 1.2.*

**Selection of busbar trunking rating as a function of the operational current total In**

| Operational current total In (A) | Busbar trunking |
|---|---|
| 0...40 | **KNA40** |
| 40...63 | **KNA63** |
| 100...160 | **KNA160 or KS160** |
| 160...250 | **KS250** |
| 250...400 | **KS400** |
| 500...630 | **KS630** |
| 630...800 | **KS800** |

## Overload criterion

**Ambient temperature**
Canalis busbar trunking is sized for an ambient temperature of 35 °C. For higher temperatures, the trunking must be derated as per the data in the tables on the technical characteristics.
Example: Canalis 400 A KS at 45 °C: In = 400 x 0.94 = 376 A.

**Installation method**
Canalis KN and KS trunking is designed to be installed edgewise.
In certain cases, it can also be installed flat (false floors) or vertically (KS rising mains).
These installation methods do not require derating for the KN and KS trunking.

**Protection against trunking overloads**
To enable future extensions, protection for prefabricated busbar trunking is generally sized for the rated current Inc (or the permissible current Iz if coefficient K1 is applied as a function of the ambient temperature).
■ Protection using gG (gI) flues:
□ determine the standardised rated current In of the fuse such that $In \leqslant Inc / 1,1$ (K1=1,1 for the fuses)
□ select the standardised rating In equal to that value or just below.
Check that $In \geqslant \Sigma (Ib \times K_S)$. If that is not the case, select the busbar trunking with the next highest rating.

***Note:*** *protection using gI fuses results in a reduction of the permissible current in the trunking.*

■ Circuit-breaker protection: select the setting current Ir for the circuit breaker such that $\Sigma (Ib \times K_S) \leqslant Ir \leqslant Inc$.

***Note:*** *circuit-breaker protection means Canalis busbar trunking can be used to the full rated load.*

## Voltage-drop criterion

The voltage drop between the head and any other point in the installation must not exceed the values in the table below:

| Installation supplied by a distribution network | Lighting | Other application |
|---|---|---|
| LV public system | 3 % | 5 % |
| High voltage | 6 % | 8 % |

For Canalis, voltage drops are indicated in V / 100 m / A in the “Characteristics” section.

$U = \Sigma (Ib \times K_S) \times L / 100$

## Short-circuit current criterion

For typical applications with power ratings up to 630 kVA, a Schneider Electric solution including the low-voltage electrical switchboard, circuit breakers and Canalis busbar trunking ensures an installation sized to handle all short-circuit levels encountered.
To check the configuration of your installation (Isc up to 150 kA), refer to the coordination tables on pages 74 and 75.
We also invite you to discover Ecodial, our complete design software for low-voltage installations (selection of circuit breakers and cables, calculation of breaking capacities, short-circuit currents and voltage drops, etc.), available from your Schneider Electric representative.

# Trunking protection
## Overload protection

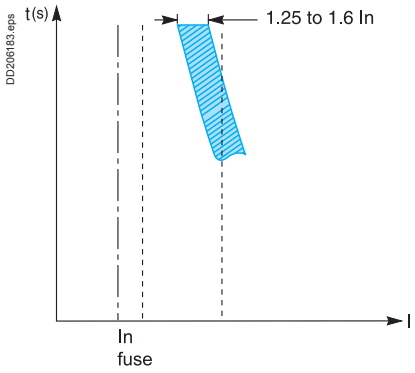
The busbar trunking rating can be optimised when the trunking is protected by circuit breakers rather than fuses.

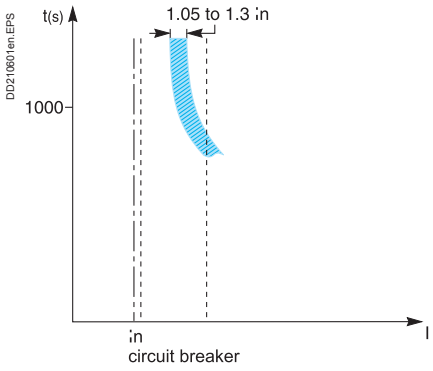
### Selection of busbar trunking with respect to protective device ratings

To take into account busbar trunking thermal overload protection, the various protection switchgear technologies and the currents under overload conditions must be considered.

**The sizing characteristics for the choice of busbar trunking and overload protection are:**

- In trunking = load current x $f_1$ x $k_2$
- $f_1$: temperature coefficient
- $k_2$: derating factor linked to the type of switchgear:
  - fuse: $k_2$ = 1.1
  - circuit breaker: $k_2$ = 1.




### Example:

**For a load current = 400 A with an ambient temperature of 35 °C:**

- Fuse protection:
  In trunking = load current x $f_1$ x $k_2$ = 400 x 1 x 1.1 = 440 A
  The recommended trunking is KS500 (In trunking = 500 A).

- Circuit breaker protection:
  In trunking = load current x $f_1$ x $k_2$ = 400 x 1 x 1 = 400 A
  The recommended trunking is KS400 (In trunking = 400 A).

**Due to their design, circuit breaker thermal settings are more precise.**

***Explanations***

- *Calibration of thermal asymptotes:*
  - *distribution fuses are calibrated to trip for overloads of between **1.25 and 1.6 times** their rated current*
  - *circuit breakers are calibrated to trip for overloads of between **1.05 and 1.3** (1.2 for circuit breakers with electronic protection) times ther current setting.*

## Thermal-setting precision

■ The fuse is assigned a fixed rating. A change in the current to be protected requires fuse replacement. **The difference between 2 fuse ratings is approximately 25 %.**
Standard ratings are given according to the series of characteristic numbers of the “Renard” series.
*For example: 40 - 50 - 63 - 80 - 100 - 125 - 160 - 200 - etc.*

■ **the circuit breaker offers a setting precision of:**
□ **5 %** for circuit breakers equipped with conventional **thermal-magnetic t**rip units
□ **3 %** for circuit breakers equipped with **electronic** trip units.
For example, a circuit breaker with a nominal rating of 100 A can easily be set to values of Ir = 100 A, 95 A, 90 A, 85 A, 80 A.

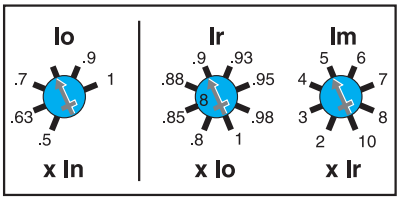
*Example:*
*a circuit breaker with a nominal rating of 100 A set to 90 A will be used to protect KS100 busbar trunking (In trunking = 100 A) which is used for an ambient temperature of 50 °C.*

## Extensive setting range of circuit breakers equipped with electronic trip units

Circuit breakers equipped with electronic trip units offer an extended range of settings:
■ thermal protection Ir adjustable from 0.4 In to In
■ short-circuit protection from 2 Ir to 10 Ir.

*Example:*
*a 250 A circuit breaker (NSX250N equipped with an STR22SE) can easily be set up for:*
■ *thermal protection from 100 to 250 A*
■ *short-circuit protection from 200 to 2500 A.*

DD210603.EPS




*Example of setting possibilities*

### Advantages:

■ This ensures a high degree of flexibility with respect to:
□ modifications (flexibility), extensions (upgradeability): protective devices can be easily adapted to the application requiring protection and to the system earthing arrangement used (protection of life and property)
□ maintenance: use of this type of device considerably reduces maintenance component stocks.

# Trunking protection
## Short-circuit protection

### Trunking characteristics

**Busbar trunking systems must meet all rules stipulated in standards IEC 60439.1 and 60439.2.**

■ With respect to short-circuits, BTS sizing is determined by the following characteristics:

□ **rated peak withstand current Ipk (kÂ):**
this characteristic expresses the instantaneous electrodynamic withstand limits of the busbar trunking. The peak current value is often the most restrictive instantaneous characteristic for the protective device

□ **maximum rms short-time withstand current Icw (kArms / ...s):**
this characteristic expresses the permissible temperature-rise limit of conductors over a given period of time (0.1 to 1 s)

□ **thermal stress in $A^2s$:**
this characteristic expresses the instantaneous thermal stress withstand of the BTS. Normally, if the short-circuit generates fault conditions that are compatible with the first two characteristics, this constraint is “automatically satisfied”.

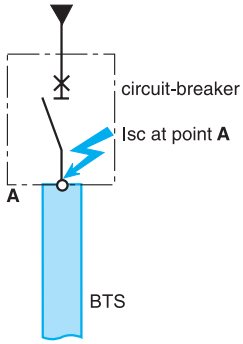
### Circuit breaker characteristics

A circuit breaker must meet the requirements of product construction standards (IEC 60947-2, etc.) and installation standards (IEC 60364 or applicable country standards), i.e. its breaking capacity Icu (1) must be greater than short-circuit current Isc at the point where it is installed.

*(1) Installation standard IEC 60364 and the construction standards specify that the breaking capacity of a circuit breaker is:*
*- the ultimate breaking capacity, Icu, if it is not coordinated with an upstream protective device,*
*- the breaking capacity enhanced by cascading, if there is coordination with the upstream protective device.*

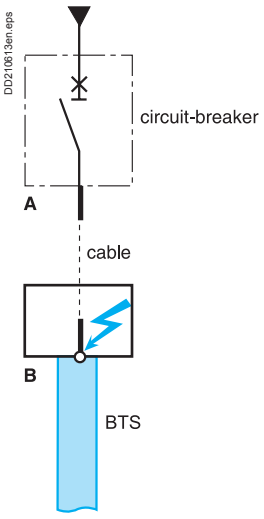
### Characteristics of the circuit breaker / trunking combination

DD210604en.EPS




**When the busbar trunking is directely protected, selection of the protective device must take into account the following requirements:**
■ circuit breaker Icu ⩾ prospective Isc at **point A**
■ BTS I peak ⩾ limited or asymmetrical prospective Isc at **point A**
■ BTS thermal withstand at Icw ⩾ thermal stress passing through the BTS.

DD210613en.eps

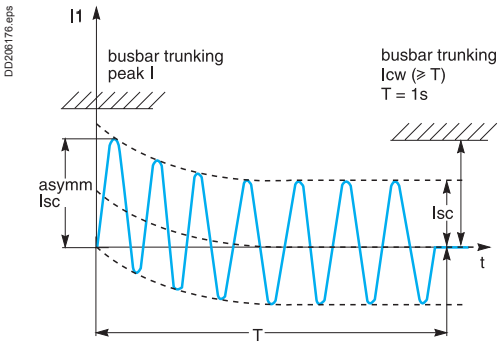



**When the busbar trunking is protected downstream of a cable, selection of the protective device must take into account the following requirements:**
■ circuit-breaker Icu ⩾ prospective Isc at **point A**
■ BTS I peak ⩾ limited or asymmetrical prospective Isc at **point B**
■ BTS thermal withstand at Icw ⩾ thermal stress passing through the BTS.

# Non-limiting or time-delayed circuit breakers

Either non-limiting (instantaneous or time-delayed) or time-delayed limiting circuit breakers can be used. They are mainly air-type power (= 800 A) circuit breakers.
**This type of circuit breaker is used to implement time discrimination and is often combined with KT type trunking.**

■ The busbar trunking must be capable of withstanding the peak fault current to which it may be subjected as well as the thermal stress during any time delay:



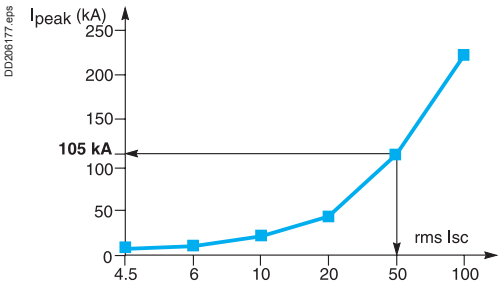

*Current value of the 1st. peak as a function of rms Isc.*

□ the permissible peak current, I peak, of the BTS must be greater than the peak value of the prospective asymmetrical short-circuit current at point A.
The value of the asymmetrical short-circuit current is obtained from the value of the symmetrical short-circuit current, Isc, multiplied by a standardised asymmetry factor (k).
The value of the first short-circuit asymmetry peak in the transient state is taken into account.

**Standardised table for asymmetrical short-circuit calculations**

| Isc: prospective symmetrical short-circuit | Asymmetry factor k |
|---|---|
| kA (rms value) | k |
| 4.5 ⩽ I ⩽ 6 | 1.5 |
| 6 < I ⩽ 10 | 1.7 |
| 10 < I ⩽ 20 | 2.0 |
| 20 < I ⩽ 50 | 2.1 |
| 50 < I | 2.2 |

*For example, for a circuit with a prospective short-circuit current of 50 kA rms, the first peak reaches 105 kA (50 kA x 2.1). See the figure opposite.*




*Transient and steady states of a short-time short-circuit.*

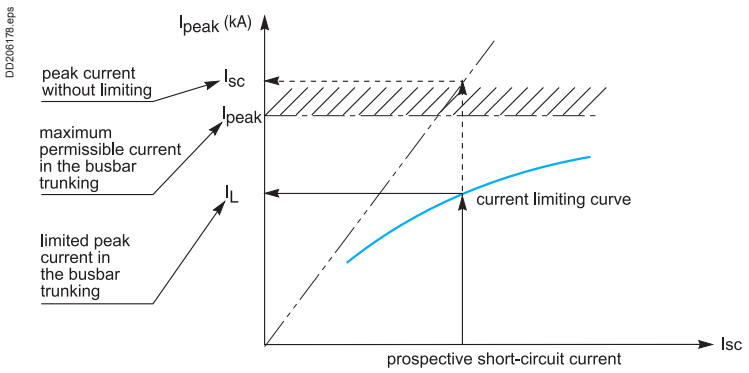
□ the short-time withstand current Icw of the BTS must be greater than the current Isc flowing through the installation for the duration of the short-circuit, (duration T = total breaking time, including the time delay if applicable).

If one of these criteria is not satisfied, the rating of the busbar trunking to be used must be increased.

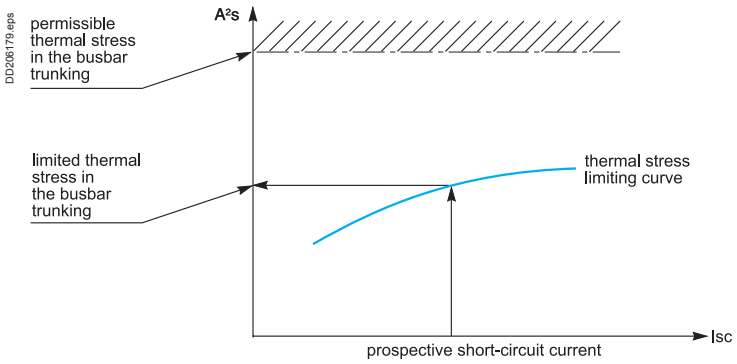
# Trunking protection
## Limiting circuit breakers

This mainly concerns protection of BTS by moulded-case circuit breakers (⩽ 1600 A).
This type of circuit breaker is used for energy discrimination and is therefore often combined with Canalis KN and KS trunking.

■ In this case, the BTS must withstand the peak current limited by the protective device and the corresponding thermal stress.
□ The current limited (I peak) by the circuit breaker must be less than the peak current permitted in the BTS.
□ The thermal stress limited by the circuit breaker must be less than the thermal stress permitted in the BTS.




*Checking the BTS withstand capacity in terms of peak current.*




*Checking the BTS withstand capacity in terms of thermal stress.*

## Limiting capacity

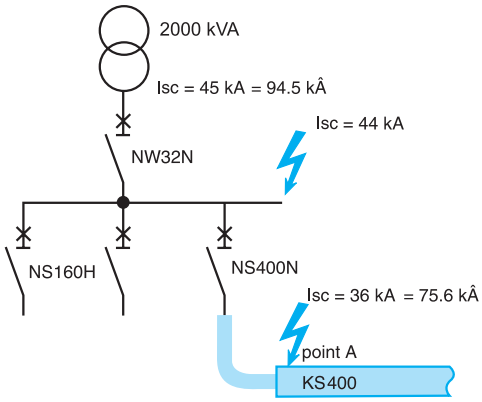
Busbar trunking ratings can be optimised when circuit breakers rather than fuses are sed for protection.

The circuit breakers in the Compact NSX range are limiting circuit breakers with a high current-limiting capacity.
A circuit breaker's limiting capacity is its ability to let only a limited current $I_L$, lower than the prospective asymmetrical peak short-circuit current Isc through in the event of a short-circuit.
**The consequence is a considerable reduction in electrodynamic and thermal stresses in the protected installation.**

PB108157.eps

## Example of a mid-sized installation (> 1000 kVA)

DD206180R.eps

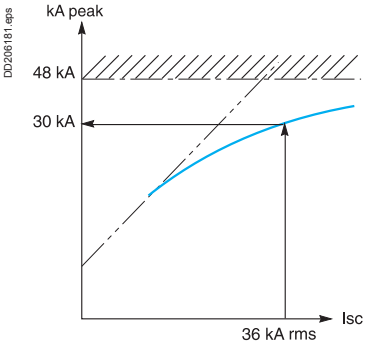



The diagram opposite shows the protection provided by an NSX400N limiting circuit breaker for KS400 trunking.

■ Without taking into account the circuit breaker's limiting capacity:
□ the prospective Isc at point A would be 75.6 kÂ
□ KS800 trunking would be required (Ipeak = 78.7 kÂ > 75.6 kÂ at point A).

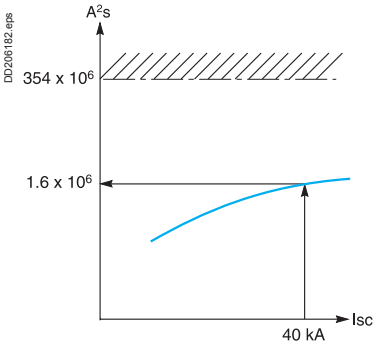
■ Taking into account the limiting capacity of the Compact NSX400N:
□ the value of Ipeak limited by the circuit breaker is 30 kÂ < 49.2 kÂ of the KS400 trunking
□ the value of the limited thermal stress is $1.6 \times 10^6 < 354 \times 10^6$ of the KS400 trunking.

DD206181.eps




*Current limiting.*

DD206182.eps




*Energy limiting.*

**Thanks to the high limiting capacity of Compact NSX400N circuit breakers, KS400 busbar trunking can be used for prospective Isc values up to 50 kA (105 kÂ) at point A.**

# Trunking protection

The selection guides below can be used to determine the circuit breaker required to fully protect the trunking depending on the prospective short-circuit current of the installation.

*Example: in an installation with a prospective Isc of 36 kA, the circuit breaker required to protect 160 A KS trunking is a NSX160F (the rating depends on the rated current of the circuit).*

In bold, the most appropriate device to the rating of the busbar trunking.

## Selection guide for 380 / 415 V

| **Type of Canalis busbar trunking KS100** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Isc max. in kA rms** | | **25 kA** | **36 kA** | | | | |
| Type of circuit breaker | NG125 | **NG125N 100** | **NG125H 100** | | | | |
| | Compact NSX | **NSX100B/F/N/H/S/L** | | | | | |
| **Type of Canalis busbar trunking KS160** | | | | | | | |
| **Isc max. in kA rms** | | **25 kA** | **36 kA** | **50 kA** | **70 kA** | **90 kA** | |
| Type of circuit breaker | Compact NSX | NSX100B/F/N/H/S/L<br>**NSX160B/F/N/H/S/L**<br>NSX250B/F/N/H/S/L | NSX100F/N/H/S/L<br>**NSX160F/N/H/S/L**<br>NSX250F/N/H/S/L | NSX100N/H/S/L<br>**NSX160N/H/S/L**<br>NSX250N/H/S/L | NSX100H/S/L<br>**NSX160H/S/L** | NSX100S/L | |
| **Type of Canalis busbar trunking KS250** | | | | | | | |
| **Isc max. in kA rms** | | **25 kA** | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NSX | NSX160B/F/N/H/S/L<br>**NSX250B/F/N/H/S/L**<br>NSX400F/N/H/S/L | NSX160F/N/H/S/L<br>**NSX250F/N/H/S/L**<br>NSX400F/N/H/S/L | NSX160N/H/S/L<br>**NSX250N/H/S/L**<br>NSX400N/H/S/L | NSX160H/S/L<br>**NSX250H/S/L** | NSX160S/L<br>**NSX250S/L** | NSX160L<br>**NSX250L** |
| **Type of Canalis busbar trunking KS400** | | | | | | | |
| **Isc max. in kA rms** | | **25 kA** | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NSX | NSX250B/F/N/H/S/L<br>**NSX400F/N/H/S/L**<br>NSX630F/N/H/S/L | NSX250F/N/H/S/L<br>**NSX400F/N/H/S/L**<br>NSX630F/N/H/S/L | NSX250N/H/S/L<br>**NSX400N/H/S/L**<br>NSX630N/H/S/L | NSX250H/S/L<br>**NSX400H/S/L**<br>NSX630H/S/L | NSX250S/L<br>**NSX400S/L**<br>NSX630S/L | NSX250L<br>**NSX400L**<br>NSX630L |
| | Compact NS | NS630b N/H/L/LB | NS630b L / LB | NS630b L / LB | NS630b LB | | |
| **Type of Canalis busbar trunking KS500** | | | | | | | |
| **Isc max. in kA rms** | | **25 kA** | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NSX | NSX400F<br>**NSX630F** | NSX400F<br>**NSX630F** | NSX400N<br>**NSX630N** | NSX400H<br>**NSX630H** | NSX400S<br>**NSX630S** | NSX400L<br>**NSX630L** |
| | Compact NS | NS630b N | NS630b N | NS630b L / LB | NS630b LB | NS630b LB | |
| **Type of Canalis busbar trunking KS630** | | | | | | | |
| **Isc max. in kA rms** | | **≤ 32 kA** | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NSX | NSX400F<br>**NSX630F** | NSX400F<br>**NSX630F** | NSX400N<br>**NSX630N** | NSX400H<br>**NSX630H** | NSX400S<br>**NSX630S** | NSX400L<br>**NSX630L** |
| | Compact NS | NS630b N<br>NS800N | NS630b L<br>NS800L | NS630b L<br>NS800L | NS630bL<br>NS800L | NS630bL<br>NS800L | NS630b LB<br>NS800LB |
| | Masterpact NT | NT06H1<br>NT08H1 | NT06L1<br>NT08L1 | NT06L1<br>NT08L1 | NT06L1<br>NT08L1 | NT06L1<br>NT08L1 | |
| **Type of Canalis busbar trunking KS800** | | | | | | | |
| **Isc max. in kA rms** | | | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NSX | | NSX630F | NSX630N | NSX630H | NSX630S | NSX630L |
| | Compact NS | | NS630bN<br>**NS800N**<br>NS1000N | NS630bL<br>**NS800L**<br>NS1000L | NS630bL<br>**NS800L**<br>NS1000L | NS630bL<br>**NS800L**<br>NS1000L | NS630bL<br>**NS800L**<br>NS1000L |
| | Masterpact NT | | NT06H1<br>**NT08H1**<br>NT10H1 | NT06L1<br>**NT08L1**<br>NT10L1 | NT06L1<br>**NT08L1**<br>NT10L1 | NT06L1<br>**NT08L1**<br>NT10L1 | NT06L1<br>**NT08L1**<br>NT10L1 |
| **Type of Canalis busbar trunking KS1000** | | | | | | | |
| **Isc max. in kA rms** | | | **36 kA** | **50 kA** | **70 kA** | **100 kA** | **150 kA** |
| Type of circuit breaker | Compact NS | | NS800N<br>**NS1000N**<br>NS1250N | NS800L<br>**NS1000L** | NS800L<br>**NS1000L** | NS800L<br>**NS1000L** | NS800L<br>**NS1000L** |
| | Masterpact NT | | NT08H1<br>**NT10H1**<br>NT12H1 | NT08L1<br>**NT10L1** | NT08L1<br>**NT10L1** | NT08L1<br>**NT10L1** | NT08L1<br>**NT10L1** |

## Selection guide for 660 / 690 V

| Type of Canalis busbar trunking KS100 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | | | **75 kA** |
| Type of circuit breaker | Compact NSX | **NSX100N/H/S/L**<br>NSX160N/H/S/L<br>NSX250N/H/S/L | **NSX100S/L**<br>NSX160S/L<br>NSX250S/L | **NSX100L** | | | |
| | Compact NS | | | | | | NS100L |
| **Type of Canalis busbar trunking KS160** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | | | **75 kA** |
| Type of circuit breaker | Compact NSX | NSX100N/H/S/L<br>**NSX160N/H/S/L**<br>NSX250N/H/S/L | NSX100S/L<br>**NSX160S/L**<br>NSX250S/L | NSX100L<br>**NSX160L**<br>NSX250L | | | |
| | Compact NS | | | | | | NS100L |
| **Type of Canalis busbar trunking KS250** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NSX | NSX160N/H/S/L<br>**NSX250N/H/S/L**<br>NSX400F/N/H/S/L | NSX160S/L<br>**NSX250S/L**<br>NSX400H/S/L | NSX160L<br>**NSX250L**<br>NSX400/S/L | | NSX400L | |
| | Compact NS | | | | | | NS400L |
| **Type of Canalis busbar trunking KS400** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NSX | NSX250N/H/S/L<br>**NSX400F/N/H/S/L**<br>NSX630F/N/H/S/L | NSX250S/L | NSX250L<br>**NSX400H/S/L**<br>NSX630H/S/L | | **NSX400L**<br>NSX630L | |
| | Compact NS | | | NS630bN | | | **NS400L**<br>NS630bLB |
| **Type of Canalis busbar trunking KS500** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | **25 kA** | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NSX | NSX400F/N/H/S/L<br>**NSX630F/N/H/S/L** | | NSX400H/S/L<br>**NSX630H/S/L** | | NSX400L<br>**NSX630L** | |
| | Compact NS | | | | NS630bN<br>NS800N | | NS400L<br>**NS630bLB**<br>NS800LB |
| **Type of Canalis busbar trunking KS630** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | **30 kA** | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NSX | NSX400F/N/H/S/L<br>**NSX630F/N/H/S/L** | NSX400H/S/L<br>**NSX630H/S/L** | NSX400/S/L<br>**NSX630/S/L** | | NSX400L<br>**NSX630L** | |
| | Compact NS | | | | NS630bN<br>NS800N | NS630bH<br>NS800H | NS400L<br>**NS630bLB**<br>NS800LB |
| **Type of Canalis busbar trunking KS800** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | **30 kA** | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NSX | **NSX630F/N/H/S/L** | **NSX630H/S/L** | **NSX630/S/L** | | | |
| | Compact NS | | | | **NS630bN**<br>NS800N<br>NS1000N | **NS630bH**<br>NS800H<br>NS1000H | **NS630bLB**<br>NS800LB |
| **Type of Canalis busbar trunking KS1000** | | | | | | | |
| **Isc max. in kA rms** | | **10 kA** | **15 kA** | **20 kA** | **30 kA** | **35 kA** | **75 kA** |
| Type of circuit breaker | Compact NS | | | | NS800N<br>**NS1000N**<br>NS1250N | NS800H<br>**NS1000H**<br>NS1250H | NS800LB |
| | Masterpact NT | | | | | NT08H1/H2<br>NT10H1/H2<br>NT12H1/H2 | |
| | Masterpact NW | | | | | NW08N1<br>**NW10N1**<br>NW12N1 | |

# Degree of protection

Standard IEC 60364-5-51 categorises a large number of external influences to which electrical installations can be subjected, for instance the presence of water, solid objects, shocks, vibrations and corrosive substances.
The importance of these influences depends on the installation conditions.
For example, the presence of water can vary from a few drops to total immersion.

## Degree of protection IP

Standard IEC 60529 (February 2001) indicates the degree of protection provided by electrical equipment enclosures against accidental direct contact with live parts and against the ingress of solid foreign objects or water.

This standard does not apply to protection against the risk of explosion or conditions such as humidity, corrosive gases, fungi or vermin.

The IP code comprises 2 characteristic numerals and may include an additional letter when the actual protection of persons against direct contact with live parts is better than that indicated by the first numeral.

The first numeral characterises the protection of the equipment against penetration of solid objects and the protection of people.
The second numeral characterises the protection of the equipment against penetration of water with harmful effects.

### Remarks concerning the degree of protection IP

■ The degree of protection IP must always be read and understood numeral by numeral and not as a whole.
For example, an IP31 enclosure is suitable for an environment that requires a minimum degree of protection IP21. However an IP30 wall-mount enclosure is not suitable.

■ The degrees of protection indicated in this catalogue are valid for the enclosures as presented. However, the indicated degree of protection is guaranteed only when the installation and device mounting are carried out in accordance with professional standard practice.

### Additional letter

Protection of persons against direct contact with live parts.

The additional letter is used only if the actual protection of persons is higher than that indicated by the first characteristic numeral of the IP code.
If only the protection of persons is of interest, the two characteristic numerals are replaced by the letter “X”, e.g. IPXXB.

## Degree of protection IK

Standard IEC 62262 defines a coding system (IK code) indicating the degree of protection provided by electrical equipment enclosures against external mechanical impact.

Installation standard IEC 60364 provides a cross-reference between the various degrees of protection and the environmental conditions classification, relating to the selection of equipment according to external factors.

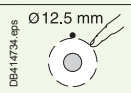
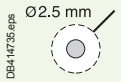
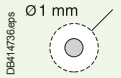
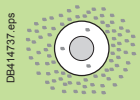
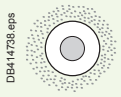
### IK●● code

The IK code comprises 2 characteristic numerals (e.g. IK05).

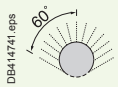
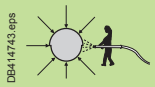
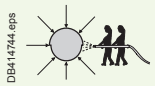
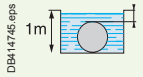
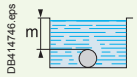
Practical guide UTE C 15-103 shows, in the form of tables, the characteristics required for electrical equipment (including minimum degrees of protection), according to the locations in which they are installed.

## Meaning of the numerals and letters representing the degree of protection IP.

**1st characteristic numeral:** corresponds to protection of equipment against penetration of solid objects and protection of persons against direct contact with live parts.

| Protection of equipment | Protection of persons | | |
|---|---|---|---|
| Non-protected | Non-protected | **0** | |
| Protected against the penetration of solid objects having a diameter greater than or equal to 50 mm. | Protected against direct contact with the back of the hand (accidental contact). | **1** |   |
| Protected against the penetration of solid objects having a diameter greater than or equal to 12.5 mm. | Protected against direct finger contact. | **2** |   |
| Protected against the penetration of solid objects having a diameter greater than or equal to 2.5 mm. | Protected against direct contact with a 2.5 mm diameter tool. | **3** |   |
| Protected against the penetration of solid objects having a diameter greater than 1 mm. | Protected against direct contact with a 1 mm diameter wire. | **4** |   |
| Dust protected (no harmful deposits). | Protected against direct contact with a 1 mm diameter wire. | **5** |   |
| Dust tight. | Protected against direct contact with a 1 mm diameter wire. | **6** |   |

**2nd characteristic numeral:** corresponds to protection of equipment against penetration of water with harmful effects.

| Protection of equipment | | |
|---|---|---|
| Non-protected | **0** | |
| Protected against vertical dripping water (condensation). | **1** |   |
| Protected against dripping water at an angle of up to 15°. | **2** |   |
| Protected against rain at an angle of up to 60°. | **3** |   |
| Protected against splashing water in all directions. | **4** |   |
| Protected against water jets in all directions. | **5** |   |
| Protected against powerful jets of water and waves. | **6** |   |
| Protected against the effects of temporary immersion. | **7** |   |
| Protected against the effects of prolonged immersion under specified conditions. | **8** |   |

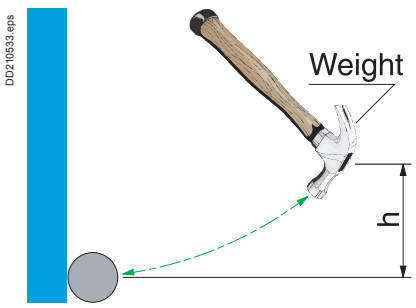
### Additional letter

Corresponds to protection of persons against direct contact with live parts.

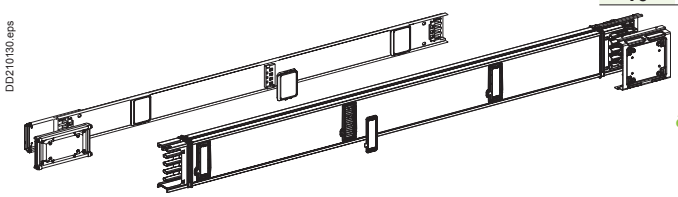
| | |
|---|---|
| **A** | With the back of the hand. |
| **B** | With the finger. |
| **C** | With a 2.5 mm diameter tool. |
| **D** | With a 1.0 mm diameter tool. |

### Degrees of protection IK against mechanical impact

The IK code comprises 2 characteristic numerals corresponding to a value of impact energy, in joules.




| | Weight (kg) | Height (cm) | Energy (J) |
|---|---|---|---|
| **00** | Non-protected | | |
| **01** | 0.20 | 7.50 | 0.15 |
| **02** | | 10 | 0.20 |
| **03** | | 17.50 | 0.35 |
| **04** | | 25 | 0.50 |
| **05** | | 35 | 0.70 |
| **06** | 0.50 | 20 | 1 |
| **07** | | 40 | 2 |
| **08** | 1.70 | 30 | 5 |
| **09** | 5 | 20 | 10 |
| **10** | | 40 | 20 |




***The Canalis KN and KS busbar trunking products are designed to provide IP55D and IK08 protection.***

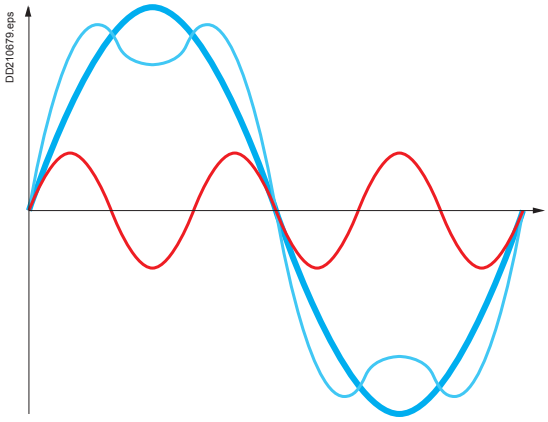
# Harmonic currents

## Origin of harmonic currents

Harmonic currents are caused by non-linear loads connected to distribution systems, i.e. by loads that draw current with a waveform different that that of the voltage that supplies them.

The most common non-linear loads are equipment including rectifiers, fluorescent lighting and computer hardware.

In installations with a distributed neutral, non-linear loads may cause significant overloads in the neutral conductor due to the presence of third-order harmonics.




**Harmonic order**
The order is the ratio between the harmonic frequency **fn** and the fundamental frequency (generally the power frequency, 50 or 60 Hz):
**n = fn / f1**

By definition, the fundamental **f1** is order 1 (H1).

Third-order harmonics (H3) have a frequency of 150 Hz (when f1 = 50 Hz).

## Estimating THD (total harmonic distortion)

The presence of third-order harmonics depends on the applications involved.
It is necessary to carry out an in-depth study on each non-linear load to determine the level of H3:
**ih3 (%) = 100 x i3 / i1**
- i3 = rms current of H3
- i1 = rms current of the fundamental

Assuming that H3 is preponderant among harmonics, the THD is close to the value of H3: ih3 (%).

There are two decisive factors:
- the types of connected devices:
  - disturbing loads: fluorescent lighting, computer hardware, rectifiers, arc furnaces, etc.
  - non-disturbing loads: heating, motors, pumps, etc.
- the ratio between the two types of disturbing loads.

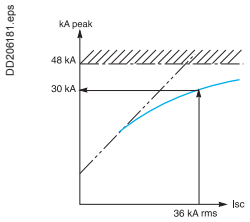

**Workshops**
Mix of disturbing loads (computers, UPSs, fluorescent lighting) and non-disturbing loads (motors, pumps, heating).

**Low probability of harmonics**
THD ⩽ 15 %.


**Offices**
Numerous disturbing loads (computers, UPSs, fluorescent lighting).

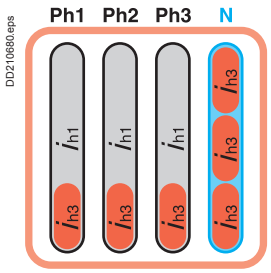
**High probability of harmonics**
15 % < THD ⩽ 33 %.

## Effects of harmonics on Canalis busbar trunking




**Fundamental frequency: ih1 (50 Hz)**

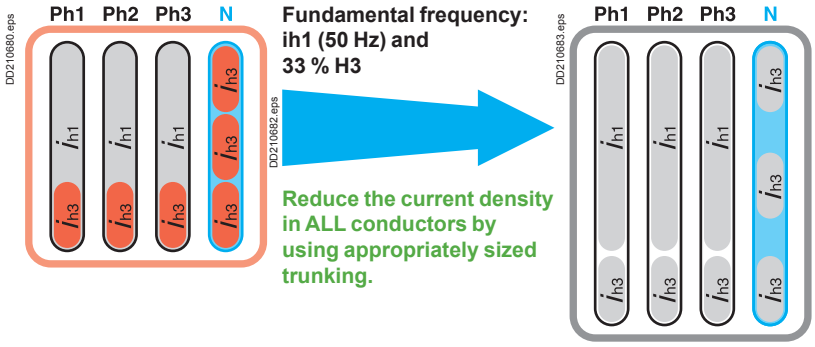
No current in the neutral.
The conductors are correctly sized.




**Fundamental frequency: ih1 (50 Hz) and 33 % of H3**

Abnormal temperature rise in the conductors caused by current at a higher frequency in the phases (skin effect) and current in the neutral caused by summing of the H3 harmonics.

## The only effective solution




## Busbar-trunking selection

| THD ⩽ 15 % | 15 % < THD ⩽ 33 % | THD > 33 % | Busbar trunking | Rating (A) |
|---|---|---|---|---|
| 25 | 20 | 16 | **KBA / KBB** | 25 |
| 40 | 32 | 25 | **KBA / KBB** | 40 |
| | | | **KN** | 40 |
| 63 | 50 | 40 | **KN** | 63 |
| 100 | 80 | 63 | **KN** | 100 |
| | | | **KS** | 100 |
| 160 | 125 | 100 | **KS** | 160 |
| 250 | 200 | 160 | **KS** | 250 |
| 400 | 315 | 250 | **KS** | 400 |
| 500 | 400 | 315 | **KS** | 500 |
| 630 | 500 | 400 | **KS** | 630 |
| 800 | 630 | 500 | **KS** | 800 |
| 1000 | 800 | 630 | **KS** | 1000 |

**Example.** For a total rms current of **376 A**, (estimation based on power drawn by loads, including harmonics), the operational current is **400 A**.
THD is estimated at 30 %. The appropriate trunking is **KS500 A**.

## For more information on harmonics

See the Cahier Technique publications on the Schneider Electric web site:
www.schneider-electric.com

# Direct current

## Determining the DC current value

### Thermal effect

**Rule**

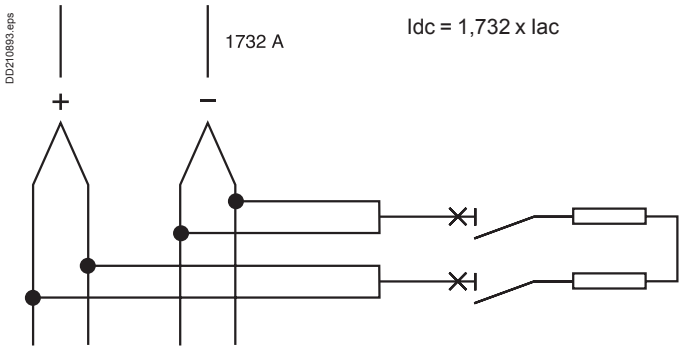
The total power dissipated as heat must remain constant in the duct:
Pac = Pdc

Where:
- the power dissipated as heat: **Pac** = 3 x R x Iac² where:
  - R= resistance of a conductor
  - Iac = conductor rms current
- the dissipated power for 4 conductors: **Pdc** = 4 x R x Idc² where:
  - Idc = direct current.

### Selection table

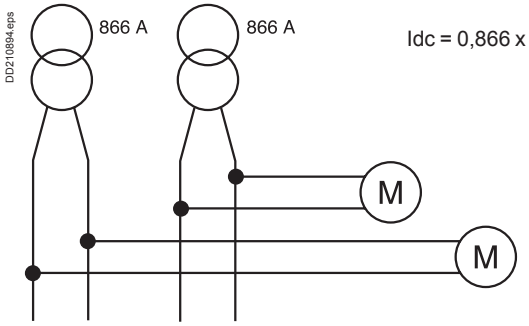
- 1 source

Case of 2 conductors in parallel for the + and 2 conductor in parallel for the **–** (only 1 circuit in the busbar trunking):




- 2 sources

Case of 1 conductor for the + and 1 conductor for the **–** (2 circuits possible in the same busbar trunking):




| Rating (A) | 1 source | 2 sources |
|---|---|---|
| **160** | 277 | 139 |
| **250** | 433 | 217 |
| **400** | 693 | 346 |
| **630** | 1091 | 546 |
| **800** | 1386 | 693 |

## Protection

With DC, there is no zero crossing point of the voltage and current to facilitate arc extinction in the protective device.
The arcing time is longer and the energy that has to be absorbed is higher than for AC.
The voltage of the DC arc must rise to the source voltage very quickly in order to "put out" the short-circuit current.
"Shortened" electrical equation: U network = R x Isc + Uarc where:

- Isc = U network - Uarc / R
- Isc = 0 when Uarc = U network.

## Use with specific switchgear

A quick rise in arcing voltage can be achieved by using series fuses, one fuse on the **+** and one fuse on the **–** of each circuit.
For some current rating and fuse characteristics, the placing of two fuses in series on each polarity may be specified (highly inductive circuit).
In some cases, two fuses must be placed in parallel for each polarity.

# Frequencies
## 400 Hz

### KS busbar trunking derating at 400 Hz

Values at 35 °C.
Application of a derating coefficient at 400 Hz combined with that for temperature derating.

| Busbar trunking derating at 400 Hz | | | | | |
|---|---|---|---|---|---|
| | KS160 | KS250 | KS400 | KS630 | KS800 |
| In (A) | 146 | 221 | 342 | 514 | 621 |
| Coefficient K at 400 Hz | 0.91 | 0.88 | 0.85 | 0.82 | 0.78 |

### Voltage drop

3-phase voltage drop, in millivolts per metre and per amp 400 Hz with load spread over the run.
For a concentration of load at the end of a run (transport), the voltage drops are double those shown in the table below.

| Voltage drop when frequency is 400 Hz in millivolts per meter and per ampere | | | | | |
|---|---|---|---|---|---|
| | KS160 | KS250 | KS400 | KS630 | KS800 |
| Cos Φ = 1.0 | 1.306 | 1.022 | 0.876 | 0.424 | 0.392 |
| Cos Φ = 0.9 | 1.278 | 1.014 | 0.875 | 0.422 | 0.391 |
| Cos Φ = 0.8 | 1.266 | 1.010 | 0.874 | 0.420 | 0.391 |
| Cos Φ = 0.7 | 1.257 | 1.007 | 0.873 | 0.419 | 0.390 |

### Conductor characteristics

| Conductor impedance at 400 Hz | | | | | | |
|---|---|---|---|---|---|---|
| | | KS160 | KS250 | KS400 | KS630 | KS800 |
| Average ohmic resistance of phase and neutral conductors at **In R20** | mΩ/m | 0.733 | 0.307 | 0.229 | 0.117 | 0.108 |
| Average ohmic resistance of phase and neutral conductors at **In R1** | mΩ/m | 0.776 | 0.325 | 0.242 | 0.124 | 0.114 |
| Average resistance at **In X1** | mΩ/m | 1.199 | 1.185 | 1.052 | 0.517 | 0.494 |
| Average resistance at **In Z1** | mΩ/m | 1.43 | 1.23 | 1.08 | 0.53 | 0.51 |

# Fire resistance

As required by standards, busbar trunking complies with:
**1 -** material resistance to abnormal temperatures,
**2 -** flame propagation resistance,
**3 -** fire barrier function when going through a partition wall,
**4 -** conservation of all circuits for 1h30 in an insulating sheath.

## Definition of tests

### 1 - Insulating material resistance test to abnormal temperatures

**Objective**
To check a material will not be suspected as being the origin of a secondary fire outbreak.

As defined in standards § 9.2. IEC 61439-6 and IEC 60695-2-10 and 2-13.

**Method**
Application of an incandescent wire for 30 seconds on the insulating materials in contact with live parts.

**Result criteria**
The specimen is considered to have passed the incandescent wire test if:
■ if there is no visible flame and no sustained incandescence
■ the specimen's flames and incandescence go out within 30 seconds of the incandescent wire being removed.

### 2 - Flame propagation resistance test

**Objective**
To check a busbar trunking will not create secondary fire outbreaks.

As defined in standards § 9.101 IEC 61439-6 and IEC 60332 part 3.

**Method**
■ Application of a flame for 40 minutes on a straight length of busbar trunking whose centre is located 2.5 metres from the edge of the burner.

**Result criteria**
The specimen is considered to have passed the test if:
■ combustion does not occur
■ the maximum extent of the burned part (external and internal) of the busbar trunking does not go beyond 2.5 metres above the lower edge of the burner.

### 3 - Fire barrier test through a partition wall

**Objective**
To check a busbar trunking will not propagate a fire from one room to another by crossing a fire barrier wall for 60, 120, 180, or 240 minutes.

As defined in standard EN 1366-3; EN 1363-1; ISO 834; DIN 4102 part 9.

**Method**
The fire barrier busbar trunking section to be tested is placed in an oven which executes a standardised temperature-time curve.

**Result criteria**
The specimen is considered to have passed the test if:
■ there are no flames behind the fire barrier
■ there is no smoke or gas behind the fire barrier (not requested by the standard; can appear as a remark in the test report)
■ the temperature rise of the casing behind the fire barrier does not exceed 180 °C.

### 4 - Conservation of all circuits in fire conditions test

**Objective**
To check all the busbar trunking's electrical circuits are preserved in fire conditions.

As defined in standard DIN 4102 part 12.

**Method**
Its entire length inserted, the busbar trunking is taken as a specimen in an insulating sheath.

**Result criteria**
The specimen is considered to have passed the test if:
■ conductor continuity is preserved
■ there is no short-circuit between conductors.

# How Canalis compensate for thermal expansion

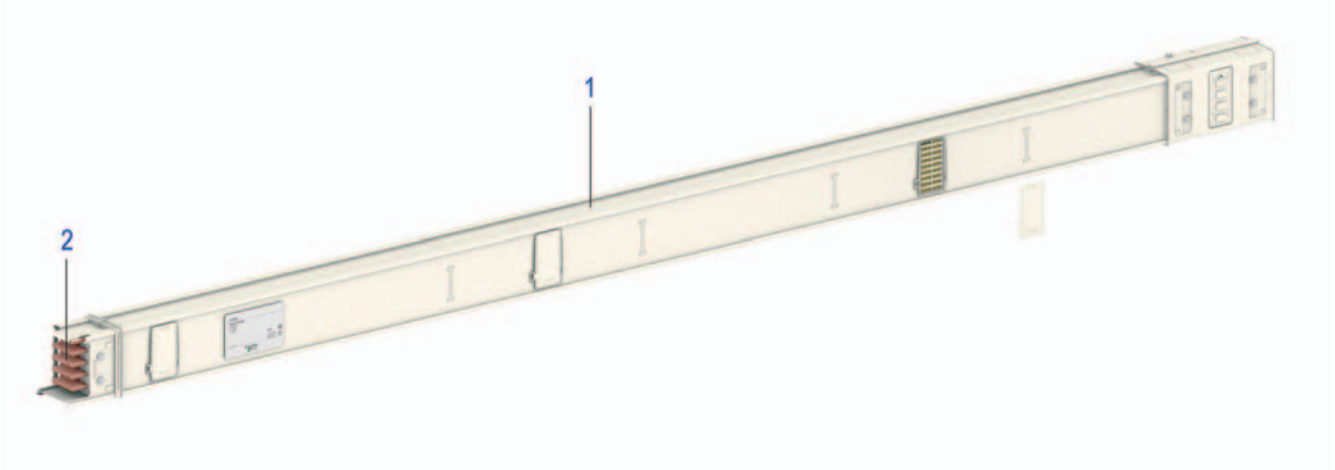
## Foreword

Prefabricated electrical trunking components expand and contract due to:
- changes in ambient temperature (e.g. summer and winter)
- current flowing in the conductors (e.g. 0 to In)

For example, consider a 30 metre long 800 A Canalis KS line equipped with ten 160 A tap-off units and installed under the roof of a building where the ambient temperature varies by more than 30 °C between summer and winter:
- just the change in the ambient temperature results in an expansion of 20 mm for the conductors and the 10 mm for the casing
- at a constant ambient temperature, the temperature rise in the conductors every morning when the installation is started (increase in current from 0 to In = 800 A) results in an expansion of 55 mm for the conductors and 7 mm for the casing.

The lengths of the sheet steel (1) and the copper conductors (2) therefore vary as a function of the changes in temperature and their specific thermal expansion coefficients.

PD2022309_r1.eps

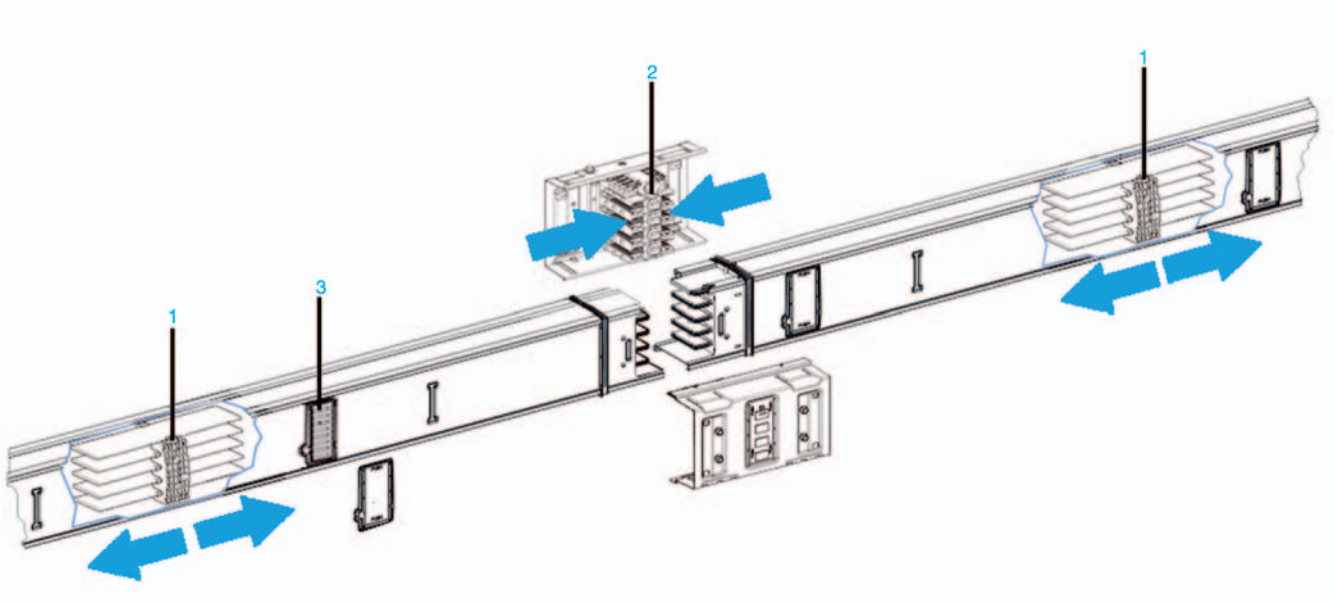



For this reason, Canalis components are designed so that these phenomena do not affect their installation or operation.

## How Canalis trunking components effectively compensate for the effects of conductor thermal expansion

Inside a trunking section, the conductors are fixed (1) at a single point in the casing and, due to the change in temperature, expand (➡) on either side of that point. The zones affected by expansion and considered critical from the electrical standpoint are the jointing system (2) and tap-off outlets (3).

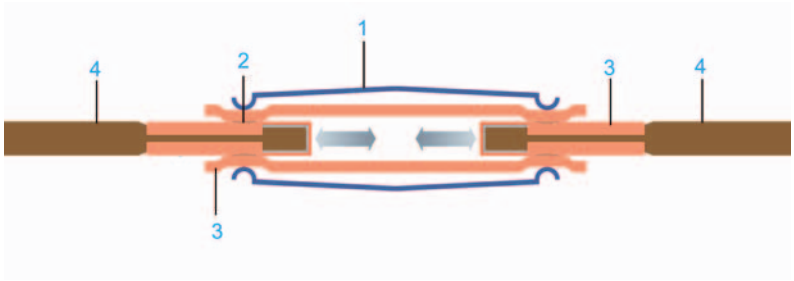
DD2022281R.eps



## How Canalis trunking components effectively compensate for the effects of conductor thermal expansion

■ The Canalis jointing system mechanically and electrically connects components (e.g. two straight lengths), but allows for the expansion and contraction of the conductors (4).
The system is made up of springs (1) and an area of sliding contacts (2) that allow conductor movement ( ) while maintaining outstanding electrical contact.
Contact quality ensured by silver-plated copper contact is one part and copper contact in the other part (3). Sufficient pressure between the two parts for good contact is maintained by the springs.
This system is used at each end of the straight lengths, every three metres.

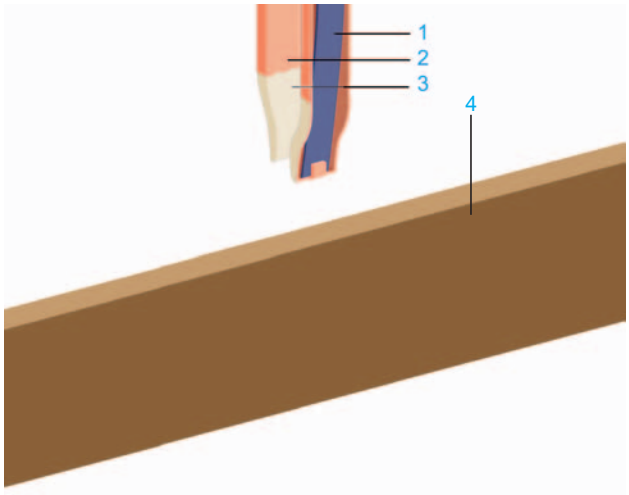
DD202282R.eps




■ At the tap-offs, conductor expansion is compensated for by a contact made of copper on which the clamps of the tap-off unit can slide.

1 Spring of clamps.
2 Copper area.
3 Silver plated copper.

DD202283R.eps




**Conclusion:** at both the jointing system and the tap-off outlets, sliding contacts can handle the expansion of the conductors.
These maintenance-free silver-plated contacts on tap-off units are guaranteed for life.

**Only the expansion of the sheet steel must be taken into account for Canalis installation, however the problem is minor because both trials and calculations show that expansion is only approximately 1 mm for every three-metre length under extreme operating conditions.**

# How Canalis compensate for thermal expansion

**Few precautionary measures used to compensate for the effects of thermal expansion in the casing, depending on how the line is installed.**

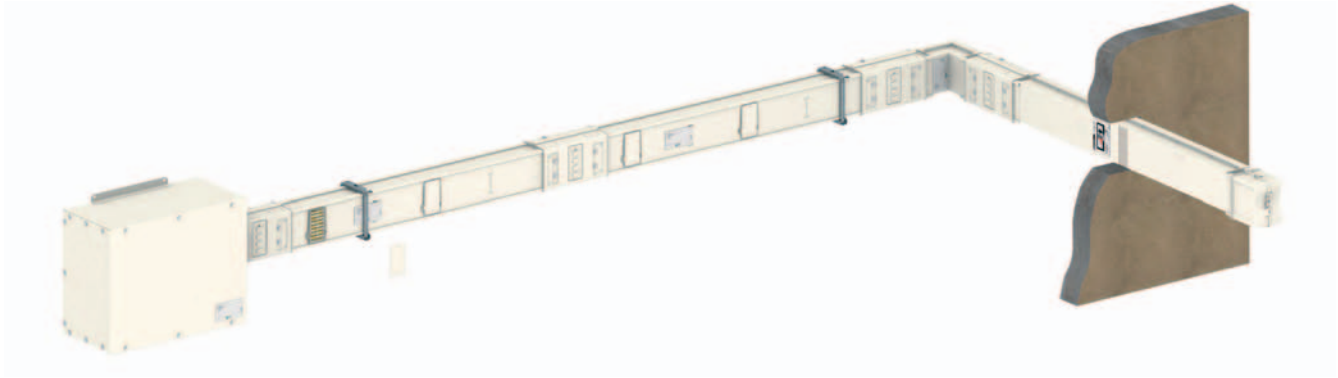
## Horizontal line

For a trunking line made up exclusively of straight lengths, as noted above, the effects of thermal expansion are not significant (only 1 mm for 3 m).
To avoid all risk of problems, Canalis trunking supports allow movement of the casing, i.e. no fixed points.

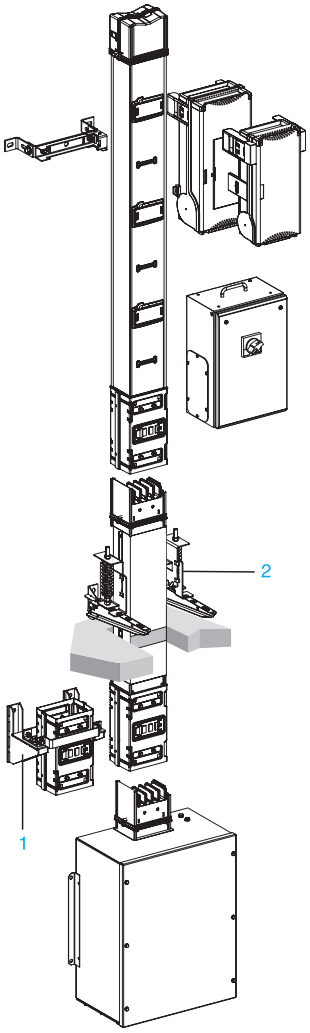
For a fixed point caused by a blocked elbow, for example, the casings compensate their expansion by slight lateral movement (0.7 mm maximum) on either side of the longitudinal axis. This movement has no impact on the contact quality of the jointing system or on the IP.

**Conclusion:** the only precautionary measure is to prevent distortion by avoiding having a number of fixed points on a single line.

PD202310_r.eps



DD202285.eps




## Vertical line (rising mains)

The effects of thermal expansion depend on the different installation methods.

**Rising mains with just one bottom support (1)**
With a bottom support attached to the wall, the riser expands upwards. At each floor, the sheet steel slides naturally through the floor.
The only precautionary measure is to avoid creating any other fixed points.

**Rising mains with spring-based fixing devices (2)**
For rising mains with spring-based fixing devices only, the riser expands both upwards and downwards. At each floor, the casing sides naturally through the fire barriers.

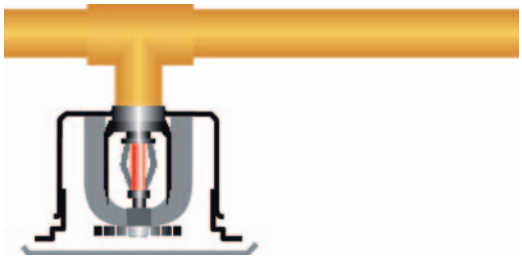
**Rising mains with more than one bottom support (1)**
More than one bottom support should not be used on a single riser to avoid creating a number of fixed points that block thermal expansion of the casing, in which case a component in the line may break.
If more than one bottom support is necessary, it is advised to break the riser into a number of sections, interconnected by cables and feed boxes, to allow thermal expansion (see section “above on Rising mains with just one bottom support”).

**Installation of rising mains does not require any particular precautionary measures. All the above solutions have been simulated by calculations and tested in a laboratory. Schneider Electric guarantees that they will maintain the safety and reliability of your installation.**

# Sprinkler test certification

## What is a sprinkler?

DD205065_reps



A sprinkler is a sprinkling device blanked off by a heat-sensitive component. It is designed to deliver water when the temperature to which it is subjected exceeds its calibration value.

The main aim of the installation is to lower the temperature in the accident area by wetting the ignited and adjacent materials by spraying water in the form of fine droplets.
The transformation of these droplets into water vapour captures a lot of energy from the fire and extinguishes it quickly. Moreover, this increased volume prevents air from flowing to the heart of the fire.

When a fire develops, ambient temperature rises to reach the calibration value. Water then leaves the sprinkler opening and strikes a deflector that projects it onto the fire in a certain form. Ground coverage ranges between 9 and 12 m² according to mounting height.

A sprinkler delivers between 60 and 120 l / min according to the hazard class.

On nuisance tripping lasting a few minutes, some hundreds of litres of water are released. IPx5 approval as per standard
IEC 60529 does not guarantee non ingress of water in the busbar trunking in these conditions, as the water volumes, test duration and projection distance vary (nozzle 22.5 mm in diameter, at a distance of 2.5-3 m, with a water volume of 12.5 l / min for 1 min / m² for at least 3 min)

To provide you with all necessary safety guarantees, Schneider Electric has chosen to go further still than the IP55 test by subjecting its busbar trunking to an extremely severe “sprinkler” test.

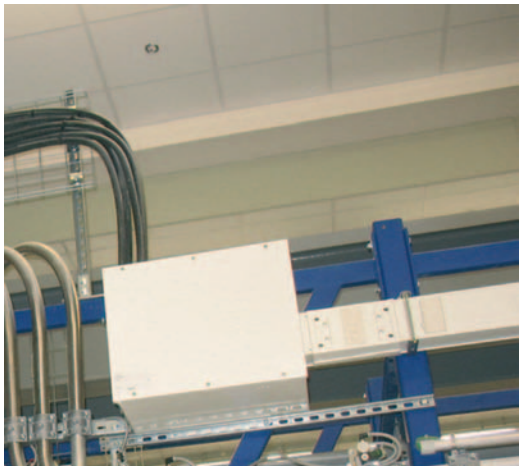
PD202443_reps

*Canalis KBA supplying luminaires nearby sprinklers.*

# Sprinkler test certification

## Sprinkler test procedure

PD202442.eps



*Canalis KS and sprinkler.*

### Chronology

In view of the absence of reference standard for sprinkler tests, we have chosen to apply the following procedure:

- insulation resistance test (1000 V)
- dielectric properties test (2.5 kV, 5 s: IEC 60439-1 & 2
- water projection
- 5 min break
- insulation resistance test (1000 V)
- dielectric properties test (2.5 kV, 5 s: IEC 60439-1 & 2.

### Water projection,

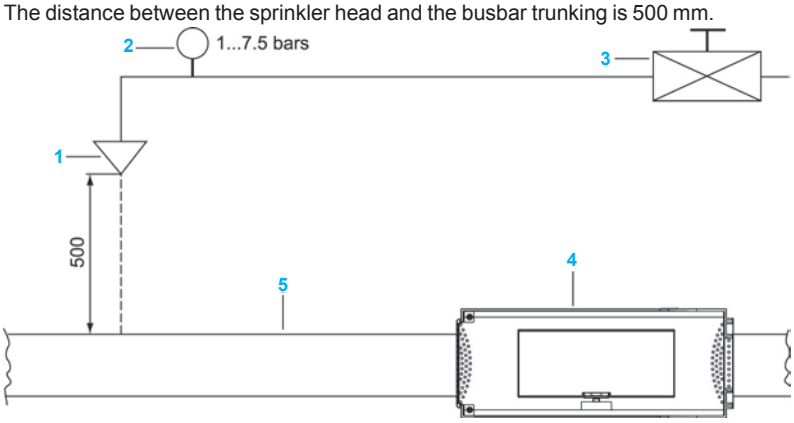
2 configurations, with or without energisation:

- horizontally installed busbar trunking:
  - 15 min water projection with sprinkler type K-Wert 115, NF ¾, 7.5 bar, 314 L/min
  - 35 min water projection with sprinkler type K-Wert 115, NF ¾, 1 bar, 115 L/min
- vertically installed busbar trunking:
  - 15 min water projection with sprinkler type K-Wert 80, NF ½, 7.5 bar, 314 L/min
  - 35 min water projection with sprinkler type K-Wert 80, NF ½, 1 bar, 80 L/min.

### Mounting position

The distance between the sprinkler head and the busbar trunking is 500 mm.

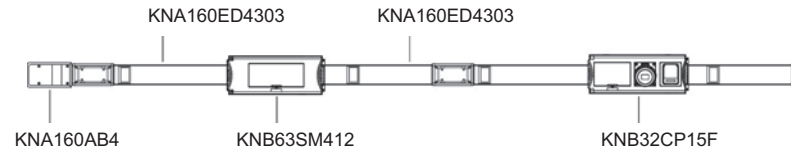
DB414747.eps




*1 Sprinkler*
*2 Pressure gauge*
*3 Closing valve*
*4 Tap-off unit.*
*5 Busbar trunking*

### Test configuration

DB414748R.eps



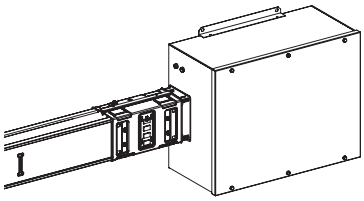

**Test results**

Busbar trunkings KDP, KBA, KBB, KN and KS have undergone the sprinkler test. This test, if successful, proves that our busbar trunkings can operate during and immediately after sprinkling of a line by a sprinkler for a period of 50 min.

# Maintenance recommendations for your installation

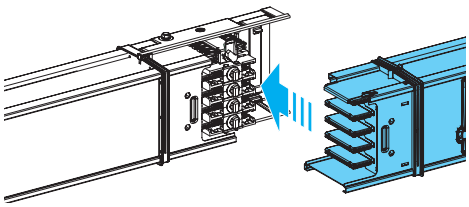
## Maintenance on power-distribution lines

DD202301.eps



**Feed units**
They are equipped with terminals up to 100 A and lug connectors for higher ratings.
As for all screw-type connections, it is advised to check tightness one year after installation and then run checks at longer intervals.
The feed units are jointed to the first run component of the line (see next paragraph).
This connection is maintenance free

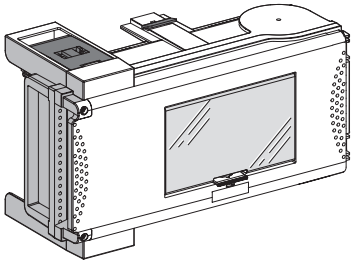
DD202302.eps



**Run components**
They are interconnected by electrical jointing units ensuring automatic and simultaneous connection of all live conductors.
The contacts are clamp + spring type and exert no forces on the plastic parts.
The electrical contacts of the jointing unit for the conductors are copper on silver-plated copper.
**This type of sliding connection is maintenance free.**

Components can be dismantled and reused.

DD202303.eps



**Tap-off units**
Trunking contacts are flexible, made of silver-plated clamps providing optimum contact quality. The contacts do not press or apply any forces on the plastic parts.
They connect to the live line conductors at the tap-off outlets. Conductors are made of silver-plated copper at the point of contact.
**These components are maintenance free.**

The connections for outgoing cables are made to terminals or using lugs.
As for all screw-type connections, it is advised to check tightness one year after installation and then run checks at longer intervals.

## Other recommandations

### Maintenance of devices

For all devices installed in Canalis tap-off units, follow the manufacturer's instructions (as for installation in a switchboard).

### Visual check

**Cleaning**
It is advised to check annually that trunking is clean and to remove any dust, water, oil or other conducting substances or objects from sensitive zones such as junctions, tap-off outlets and tap-off units.

**External appearance**
Check the external appearance of the trunking to detect:
- signs of shocks, in which case it is necessary to check the degree of protection to avoid any risk of insulation faults
- anomalies, i.e. incorrect implementation of the trunking (incorrect supports, etc.)
- traces of corrosion (in particular on supports).

### Reuse after exposure to water

If a Canalis line is exposed to water during installation, it is necessary to measure the insulation resistance of the line by isolating the supply and the loads.
- If R < 0.69 MΩ, the installation must not be energised:
  - cut the line in two by removing the jointing unit in the middle
  - locate the faulty zone
  - remove all jointing covers and dry the parts using compressed air
  - continue until the insulation resistance is greater than 0.69 MΩ
  - the system can then be energised.

# Notes

# Notes

# Notes

**Schneider Electric Industries SAS**

35, rue Joseph Monier
CS 30323
92506 Rueil Malmaison Cedex
France

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

*As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.*

Publication: Schneider Electric Industries SAS
Photos: Schneider Electric
Publishing:

*This document has been printed on ecological paper.*