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Technical System Catalogue
VX25 Ri4Power

ENCLOSURES · POWER DISTRIBUTION · CLIMATE CONTROL · IT INFRASTRUCTURE · SOFTWARE & SERVICES

FRIEDHELM LOH GROUP

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VX25 Ri4Power

The modular system for switchgear and power distributors

VX25 Ri4Power as a system for switchgear and power distributor systems, suitable for rated currents of up to 6300 A.
The wide range of standard sections allows it to be customised to your individual requirements.
Super-efficient assembly thanks to the small number of components and the use of standard copper bars.
The VX25 Ri4Power switchgear system is project-planned using the Rittal Power Engineering configuration software, available as an online tool on the Rittal website. Once project planning is complete, the individual design verification can also be generated with this software.

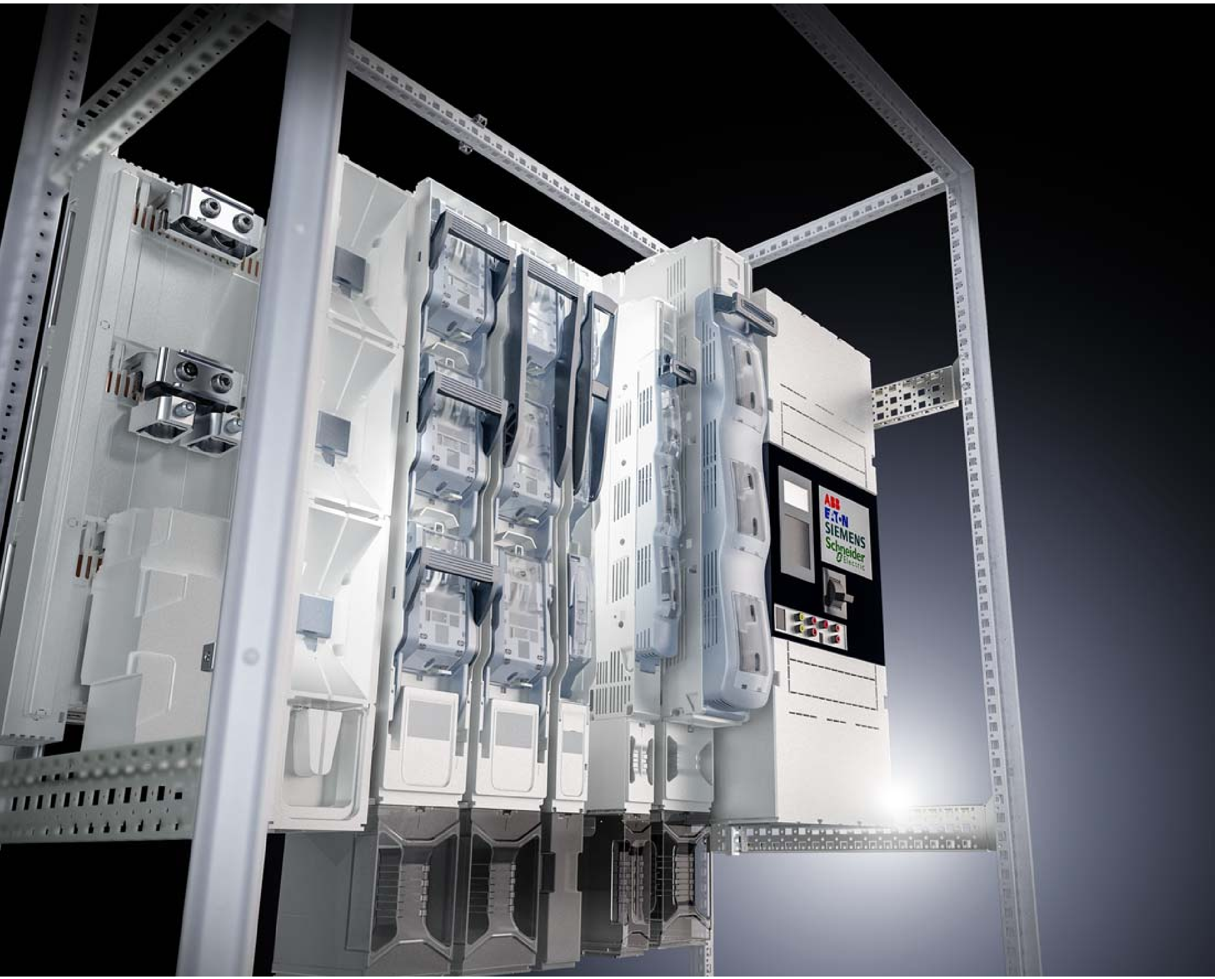
What we offer

- Modular system for switchgear
- Rated voltage up to 690 V
- Rated current up to 6300 A
- Short-circuit protection up to 100 kA
- Simple assembly and fast contact with a comprehensive range of system accessories
- Also suitable for use in DC zones
- Standardised system packages for connection systems
- Design verification to IEC 61 439
- Accidental arc-tested to IEC 61 641

Your benefits

- Perfect system technology in a compact design
- Consistent use of standard copper bars
- Suitable for all standard protective gear and switchgear currently on the market
- User-friendly project planning and generation of a design verification using configuration software
- Drawings for the customer to manufacture copper connection kits are easily produced using the configuration software

For further information about VX25 Ri4Power, please see page 8



The system for more reliable power distribution

The VX25 Ri4Power 185 Compact busbar system for rated currents of up to 2100 A is ideal for the compact, secure assembly of power distributors with due regard for financial aspects and the requirements of standard IEC 61 439.
The system technology is based on 185 mm bar centre distance and is specially adapted to the enclosure widths in the Rittal VX25 enclosure portfolio. Fast, reliable installation is achieved with standardised components and simple assembly techniques.
The VX25 Ri4Power 185 Compact busbar system is project planned using the Rittal Power Engineering configuration software, available as an online tool on the Rittal website. Once project planning is complete, the individual design verification can also be generated with this software.

What we offer

- Complete solution for central, compact power distribution
- Rated voltage up to 690 V
- Rated current up to 2100 A
- Short-circuit protection up to 50 kA
- Bar centre distance 185 mm
- Complete contact hazard protection up to IP2XB (safe from finger-contact) from our system portfolio
- Precise-fit connection and component adaptors for tested connection at high currents
- Fuse elements to suit all situations

Your benefits

- System assembly, installation and extension with no drilling or removal of covers
- Busbar contacting – variable, no-drill and contact hazard-protected from the outset
- Suitable for all standard protective gear and switchgear currently on the market
- Busbar shielding integrated into the cover section to prevent accidental arcing
- User-friendly project planning and generation of a design verification using configuration software

For further information about VX25 Ri4Power 185 Compact, please see page 60

ACB section
For the infeed and output of large currents into and from the switchgear. Air circuit-breakers are used to protect people and machines.

Cable chamber
For distributing cables and lines leading into or out of compartments, to provide cable management for outgoing sections. Cable entry is optionally from above or below.

Outgoing section
For the installation of circuits with switchgear, power supply outlets, controllers, switchgear units, fused outgoing feeders and much more, allowing circuits and controllers to be combined under one roof.

Fuse-switch disconnector section
For compact, variable distribution of electric power with fused switchgear. Plug-type NH slimline fuse-switch disconnectors are used here, supported by vertical distribution busbar systems.

VX25.
SYSTEM
PERFECTION.

VX25 Ri4POWER

Modular section system for switchgear

Form 2b
As effective protection against accidental contact with the busbar. Designed as an internal sub-division of the busbar compartment into functional space and adjacent compartment.

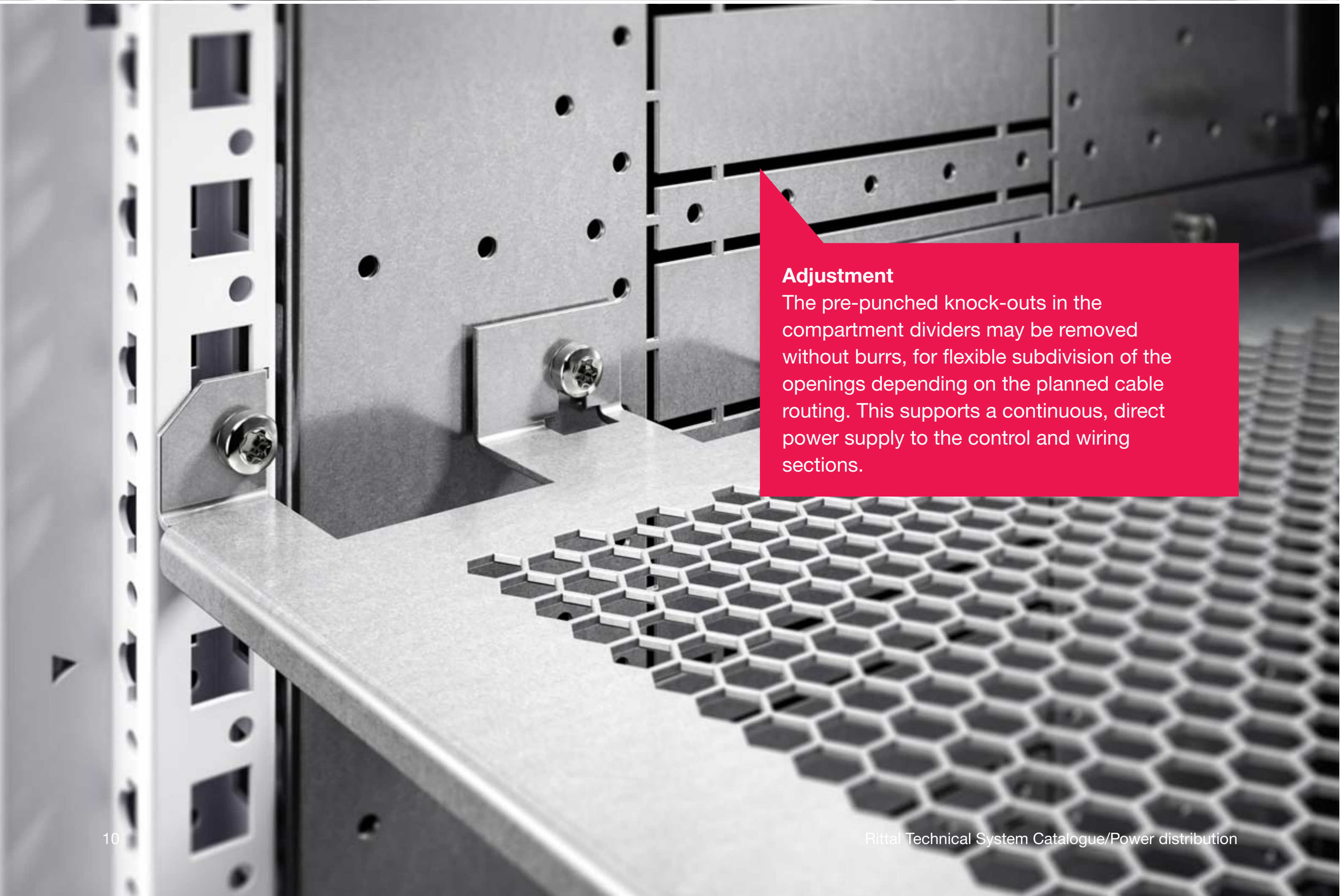
Coupling section
For disconnecting or connecting busbar systems within low-voltage equipment.
Also for maintaining machine and plant uptime, because individual sub-sections may be disconnected separately.

Tested safety

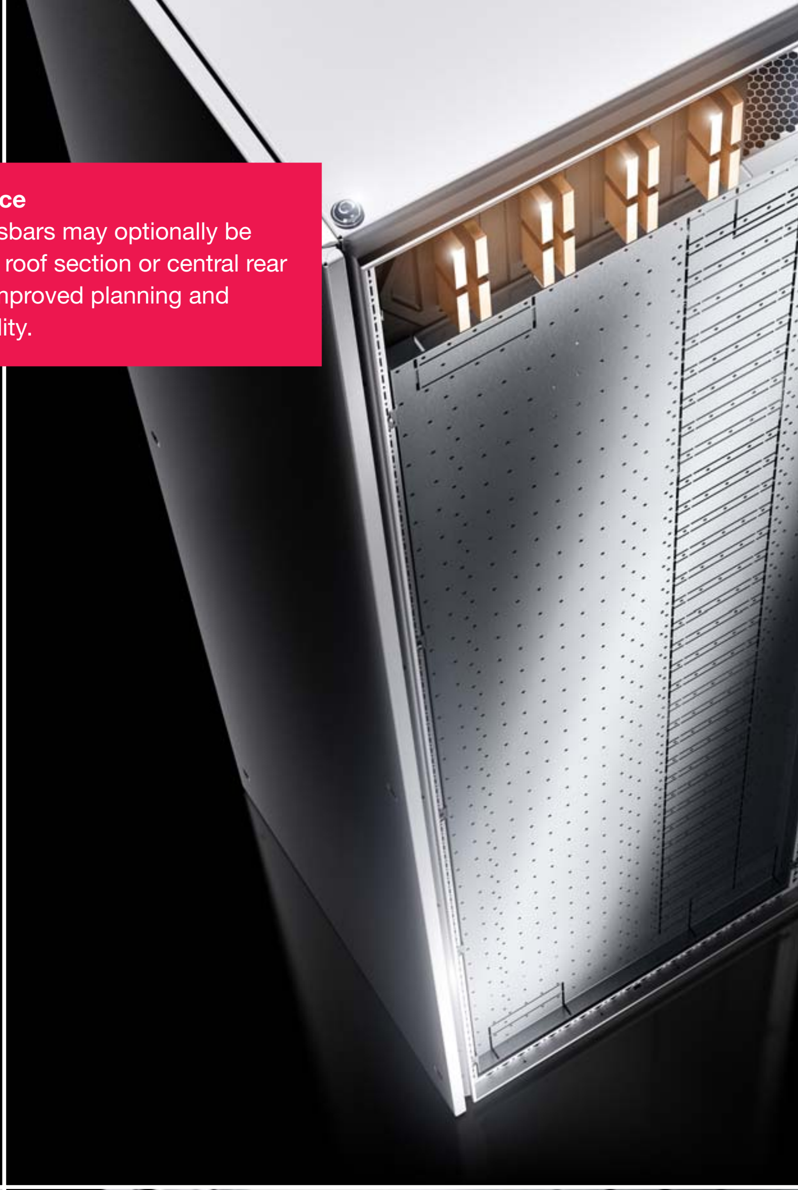
- The VX25 Ri4Power switchgear system is continuously type-tested to international standard IEC 61 439-1
- Tests with ASTA certification
- Protection category up to IP 54
- Tested accidental arcing protection to IEC 61 641
- Additional accidental arcing protection as a preventive measure

Complete partitioning
Compartment side panels matching the enclosure height instantly shield all the functional spaces below. This replaces individual vertical partitions from section to section and reduces the number of components and assembly time required.

Flexibility
The 25 mm enclosure section pitch pattern and side panel perforations allow fast, height-flexible assembly of the horizontal compartment dividers with minimal parts. They simply slide into position like a baking tray in an oven.



Adjustment
The pre-punched knock-outs in the compartment dividers may be removed without burrs, for flexible subdivision of the openings depending on the planned cable routing. This supports a continuous, direct power supply to the control and wiring sections.



Independence
The main busbars may optionally be routed in the roof section or central rear section for improved planning and space flexibility.

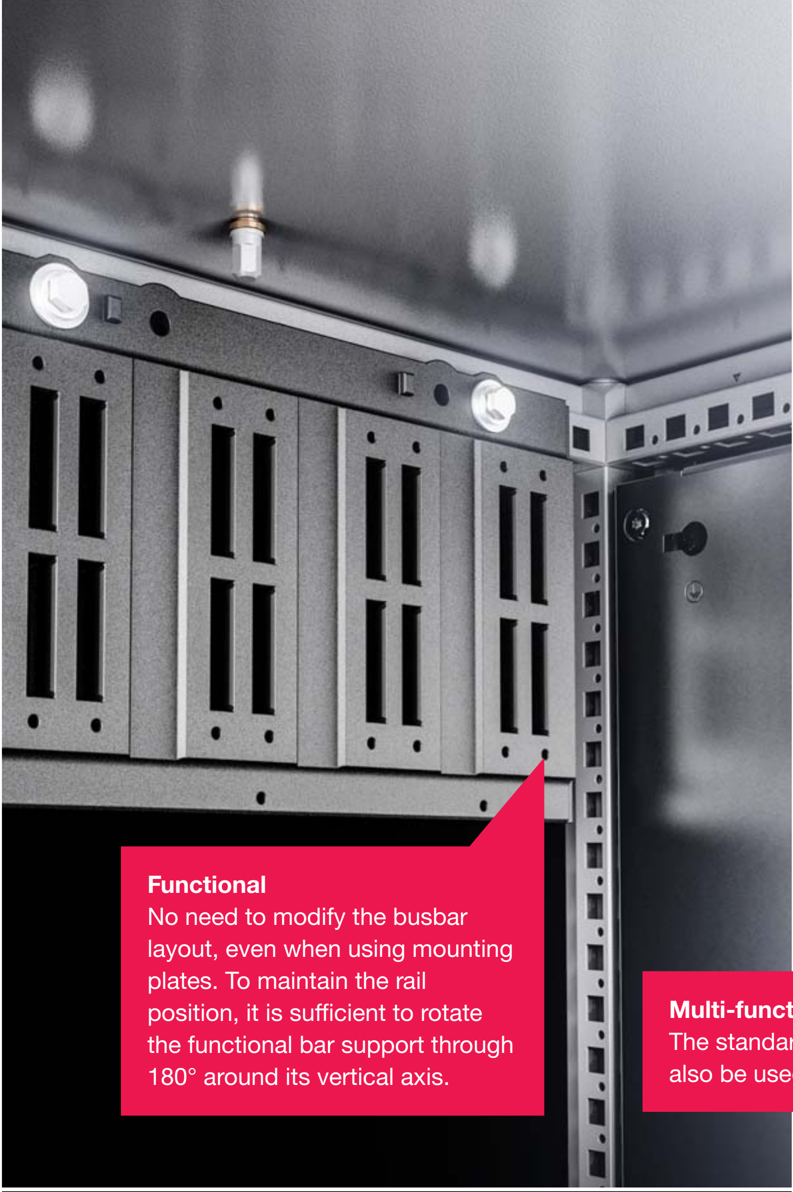
Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.

Straight lines
The pre-punched knock-outs in the compartment side panels allow PE and N conductors to be continued across sections, for straight-line routing through all section types.

Reduced number of parts
The 25 mm pitch pattern allows top busbar supports to be mounted directly onto the enclosure section. Just three screws is all you need. No further components are required.

Copper savings
Standard bars are available in 30 x 10 mm and 50 x 10 mm. The stable enclosure busbar system and the arrangement of the bars supports a higher current-carrying capacity with an identical copper bar cross-section.

Immediate machining
The standard 50 x 10 mm copper bars are already pre-punched and cut to length, to match the enclosure widths. They may be fitted directly without machining.



Functional
No need to modify the busbar layout, even when using mounting plates. To maintain the rail position, it is sufficient to rotate the functional bar support through 180° around its vertical axis.

Multi-functionality
The standard 50 x 10 mm copper bars may also be used as a neutral conductor.

Fast attachment
The open busbar support can additionally accommodate the quick-release fastener for simple, fast connection to the next section.

Bar termination
The solid bar support is used as a termination.

VX25.
SYSTEM PERFECTION.

THE ACB SECTION

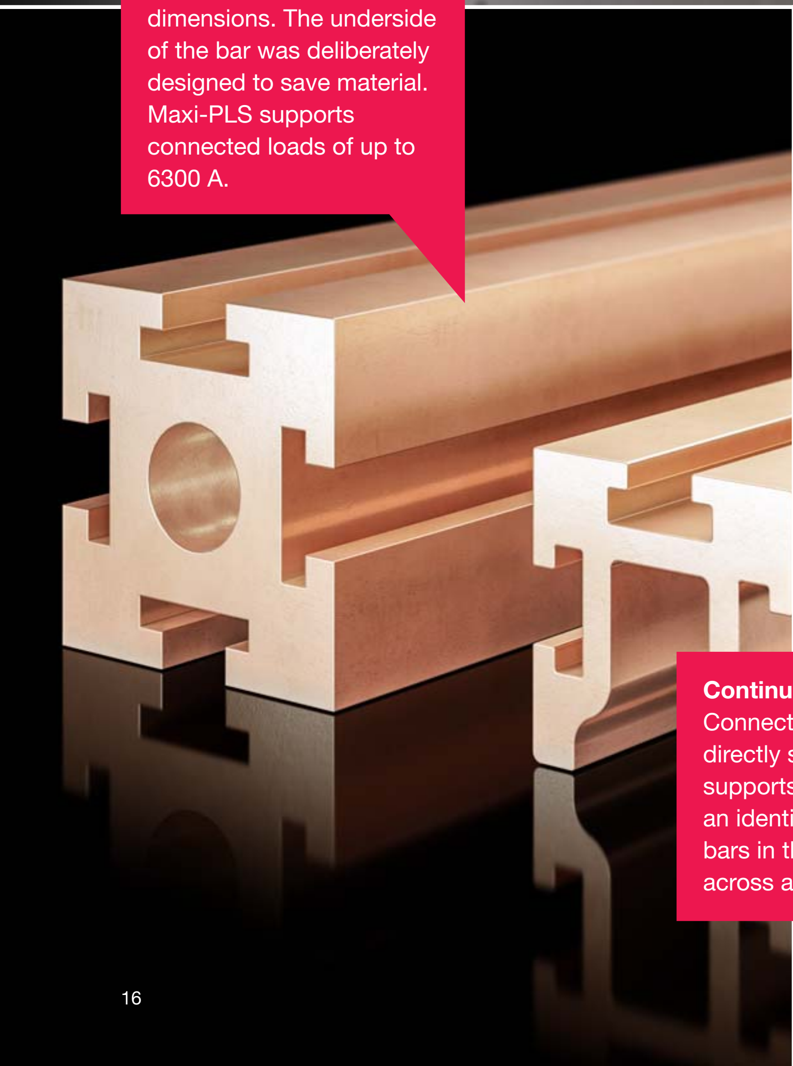
For protecting machinery and equipment

Air circuit-breakers protect machines, plant and people from damage and injury associated with short-circuits, earth faults and overloads.

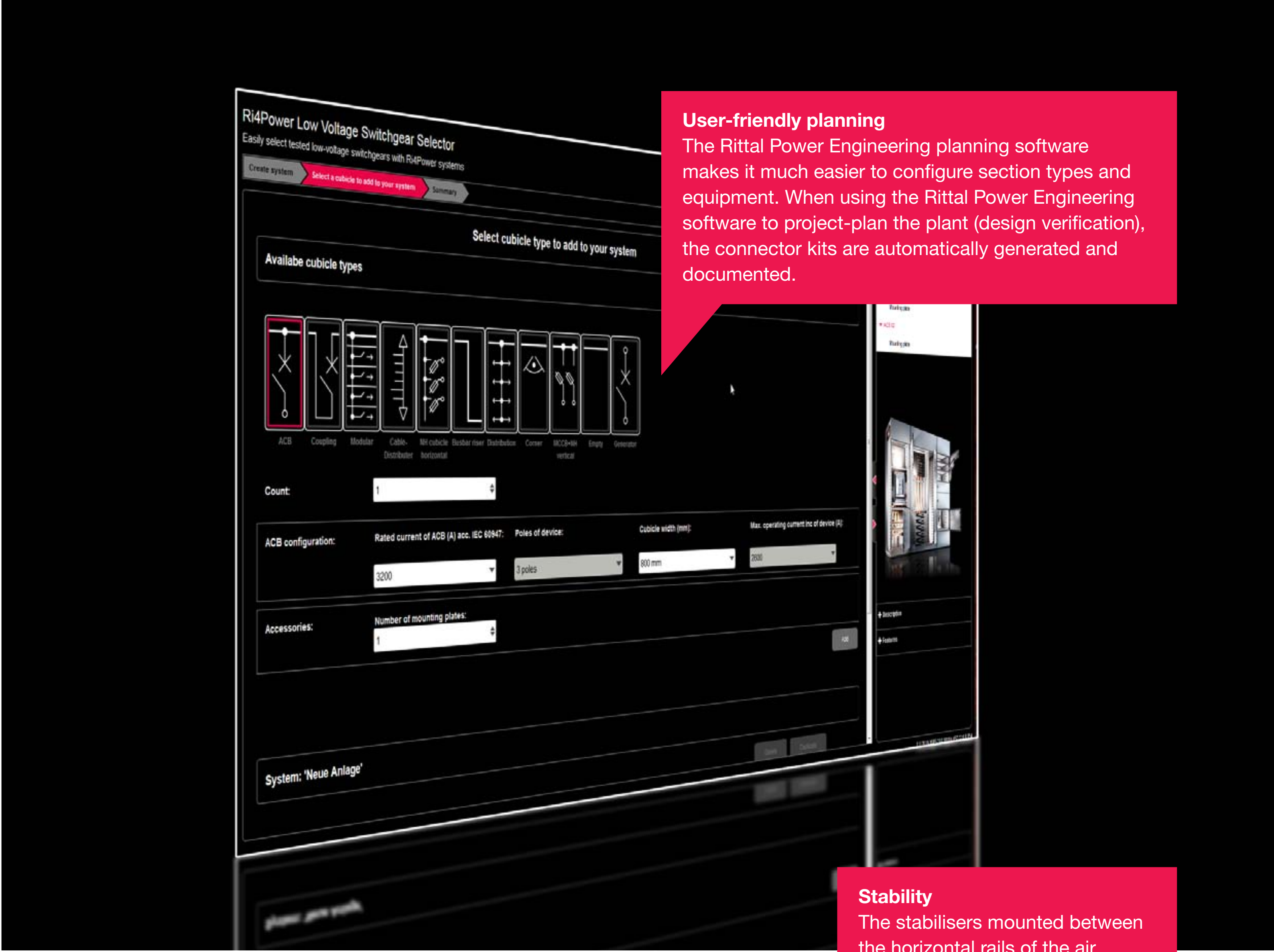
- The VX25 Ri4Power is suitable for use with air and moulded-case circuit-breakers from all well-known manufacturers, including ABB, Eaton, General Electric, Mitsubishi, Schneider Electric, Siemens, LSIS and Terasaki.
- Modular continuity and a high manufacturing quality guarantee exceptionally time-saving assembly.
- Up to 6300 A, the busbar systems are dimensioned to your specific requirements with standard copper bars and individually configured.
- All drawings of connector kits and connection brackets for connecting air circuit-breakers may be generated and printed with the Rittal Power Engineering software so that all copper parts can be prepared for installation early in the process.

Maximum performance
The end position of the rails on the compartment side panel is always identical and is defined by the existing holes. The installation of both 3-pole and 4-pole systems is supported.

Economical
The Maxi-PLS busbar system minimises the use of copper despite its large dimensions. The underside of the bar was deliberately designed to save material. Maxi-PLS supports connected loads of up to 6300 A.



Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.

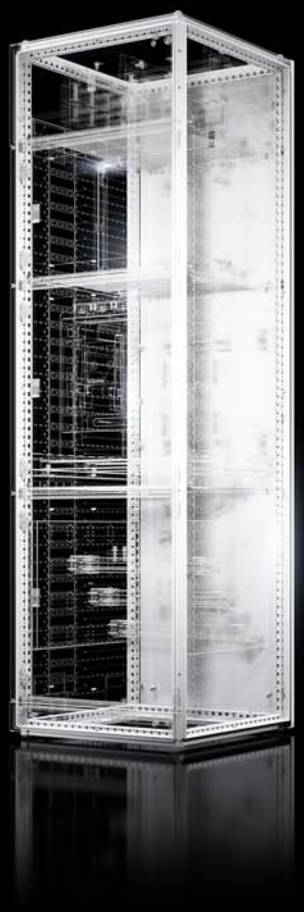


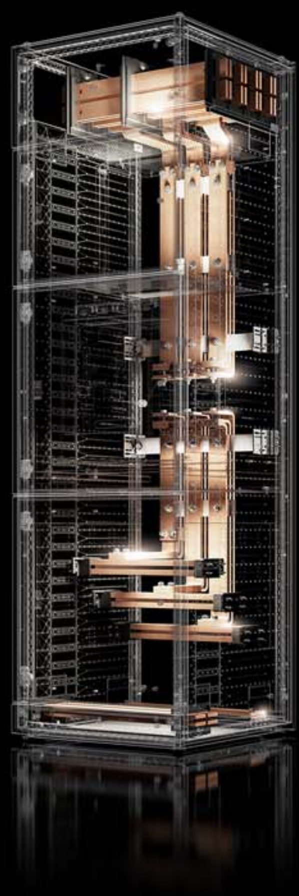
User-friendly planning
The Rittal Power Engineering planning software makes it much easier to configure section types and equipment. When using the Rittal Power Engineering software to project-plan the plant (design verification), the connector kits are automatically generated and documented.

Stability
The stabilisers mounted between the horizontal rails of the air circuit-breaker significantly improve short-circuit resistance.

Fast connection
The connection brackets, which are planned using Rittal software for a precise fit, enable circuit-breakers to be connected to the main busbar system.

Fast assembly
The mounting bracket for the air circuit-breaker support rail is attached directly to the enclosure frame section. A fast, simple and stable solution which is very easy to assemble.





Basic framework

- Modular enclosure, 2000 mm high, from the VX25 baying enclosure system
- Base/plinth, 100 mm or 200 mm high, from the VX base/plinth system
- Base/plinth trim panel, side
- Side panel(s)
- Baying with bracket, block or connector
- Partial doors and front trim panels for modular front design
- Door lock(s) from the fastener system
- Roof plate depending on the protection category and function
- Cable entries

Compartment

- Compartment side panel
- Compartment dividers
- Partial mounting plates and accessories (depending on the type of Form separation)
- Air circuit-breaker mounting bracket and support rail

Busbar system

- Flat copper busbars (Flat-PLS) for main busbar system and N/PE conductors
- Busbar supports for busbar system in roof or rear area, for busbar entry or baying
- End cover Flat-PLS
- Longitudinal connector for Flat-PLS
- Connection system for Flat-PLS
- Connection components for air circuit-breakers on bar systems or infeeds
- Infeed designed as compact infeed for Maxi-PLS
- Connection system for Maxi-PLS for cable connection on the infeed
- Accessories for busbar system, such as stabiliser, angle bracket, screws
- Busbar support, N conductor
- PE/PEN angle bracket
- Perforated cover plate with mounting bracket

VX25 Ri4Power

Circuit-breaker section

The following parameters must be known for dimensioning of the air circuit-breaker sections (ACB):

- The rated current of the circuit I_{nc} which the ACB outlet must be able to carry under the chosen conditions
- The protection category of the enclosure and type of cooling
- The design of the ACB: Rack-mounted or static installation
- The number of poles in the ACB (with switched or unswitched neutral conductor)
- The make and model of the ACB
- The mounting position of the ACB
- The rated voltage of the circuit
- The required withstand strength for the circuit and ACB

With the rated current of the circuit, the protection category and type of cooling, together with the make and model of the ACB, you can calculate the required unit size from tables 42 – 49.

With the choice of unit and other mechanical parameters, this produces the minimum size of the enclosure for the ACB. This information can likewise be found in tables 42 – 49 in the Appendix. For enclosures with internal Form separation, the minimum compartment height is derived from the rated voltage of the unit.

The mounting position of the ACB is divided into:

- Position VT (in front of door), i.e. the control components are facing outwards from the enclosure door, thus allowing the ACB to be operated without opening the enclosure door.
- Position HT (behind the door) means that the ACB including the control components are completely inside the enclosure.

This means that for some switchgear positioned in front of the door, a version with a 600 mm enclosure depth would be possible, whereas for versions behind the door, only 800 mm deep enclosures are possible. A further restriction arises when using busbar systems in the rear section. Due to the set forward position of the connection kit of the main busbar system in relation to the ACB, some versions might only be possible in 800 mm deep enclosures, whereas with main busbar systems in the roof or rear centre section, a 600 mm deep enclosure would also be possible.

In addition to the ACB, control and measurement equipment with a maximum heat loss of 50 W may be installed in the circuit-breaker section.

Circuit-breaker sections from the modular VX25 Ri4Power system are comprised of VX25 enclosures with Form-separated, variable configuration with partial doors and inner compartmentalisation in a modular design and other required system accessories. Circuit-breaker sections with rear centre section only have an internal form separation in Form 1 (higher form possible by customer). Testing has verified that air circuit-breakers from ABB, Eaton, General Electric, Mitsubishi, Schneider Electric, Siemens, LSIS and Terasaki may be used. The information provided in tables 42 – 49 applies to the choice of connection cross-sections. If Rittal has not made any particular stipulations regarding the required clearance at the sides, above and below the circuit-breakers, the equipment manufacturer's specifications should be observed.

The main busbar system may optionally be installed in the roof or rear centre section. When using partial doors, front trim panels with a protection category as per the technical specifications should be used for the upper and lower termination of the modular equipment. The cable connection system as an incoming or outgoing circuit, 3/4 pole, with compact, square profile is installed in a stepped arrangement above and/or below the ACB.

The detailed configuration of the circuit-breaker sections can be found in the valid VX25 Ri4Power assembly instructions.

Note:
Table 42 – 49, see page 132 – 147
The equipment manufacturer's specifications must be observed.

VX25 Rittal Power Engineering

The free online tool can be found on the Rittal website at www.rittal.de/planungssoftware

VX25.
SYSTEM
PERFECTION.

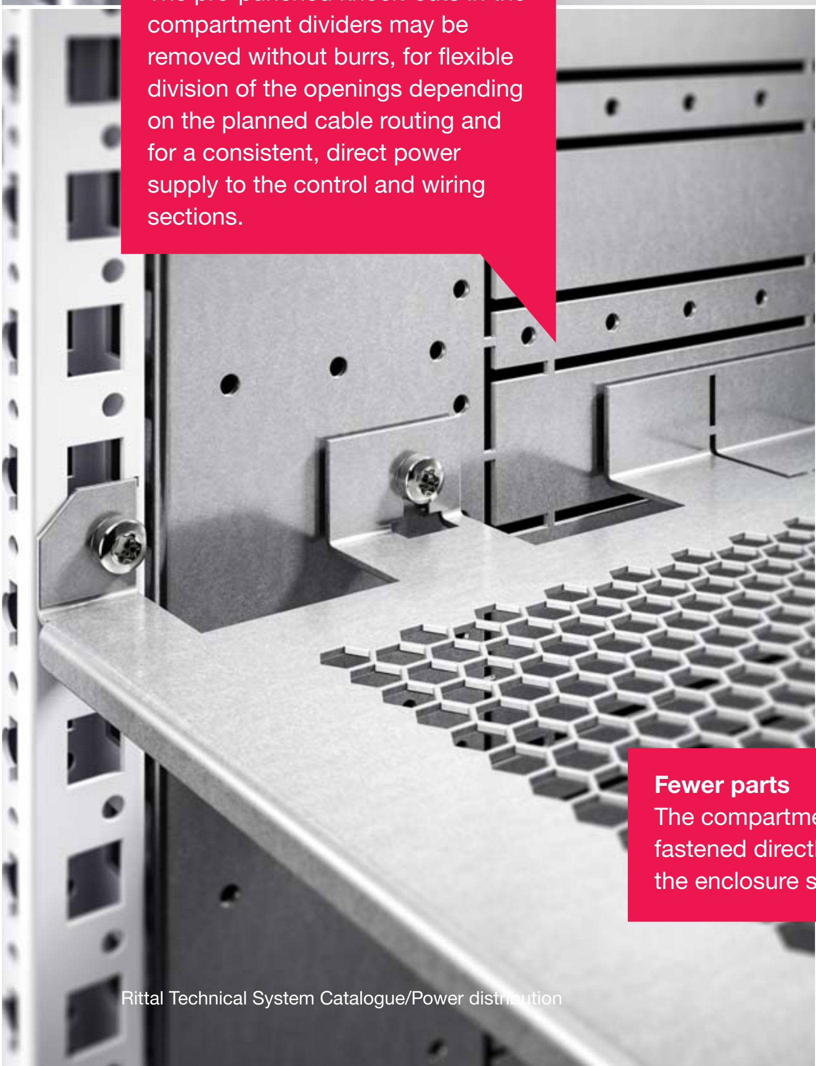
THE OUTGOING SECTION

To combine switching and control functions
In the outgoing section, many different components may be connected under one roof, such as power distributors with control units. To achieve this, individual compartments, shielded from one another, are created within the section.

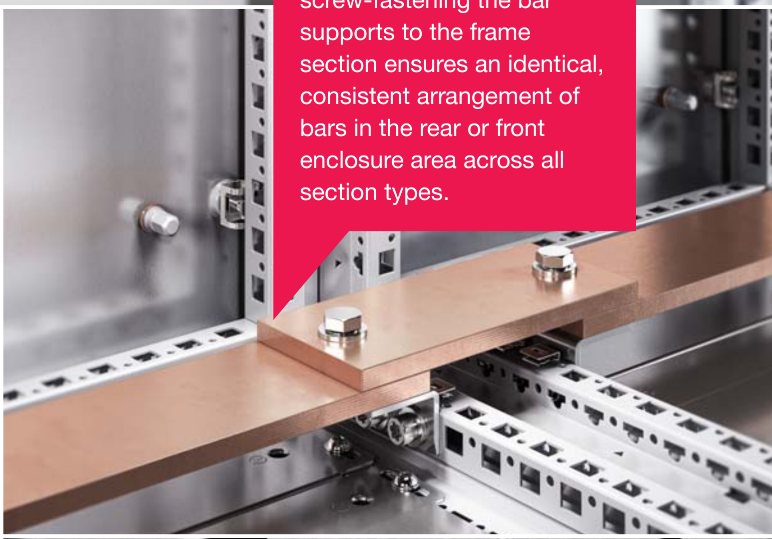
- Each compartment is configured to suit your requirements with VX25 Ri4Power system components and then individually populated e.g. with switchgear, power supply outgoing feeders or control units.
- The busbar distribution system may be positioned adjacent to or behind the compartments and is easily and safely connected to the main busbar systems using system components.
- The fully modular busbar system can be used across all sections and compartments and is exceptionally straightforward to plan and install. It also offers extensive individualisation options with uncompromising consistency.

Utilisation of the section
The modular partial door concept is quickly achieved. Compartment side panels matching the enclosure height simultaneously shield multiple compartments. The 25 mm pitch pattern of the frame section supports variable compartment heights to maximise use of the section.

Multi-functional
The compartment divider will fit any section type. Benefits: Fewer components, plus a high level of efficiency. The air-permeable grille supports thermal convection across the entire section, ensuring improved pressure equalisation throughout the compartment.

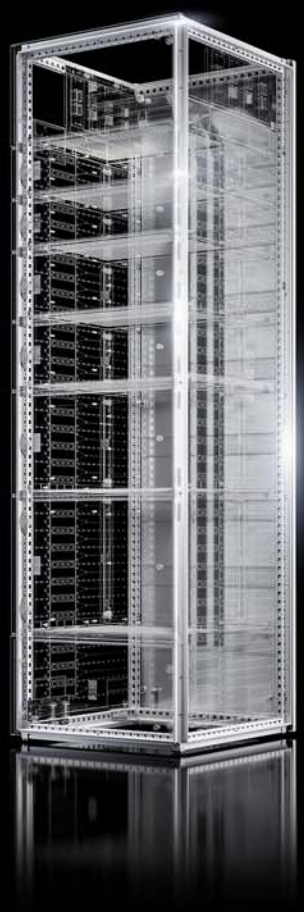


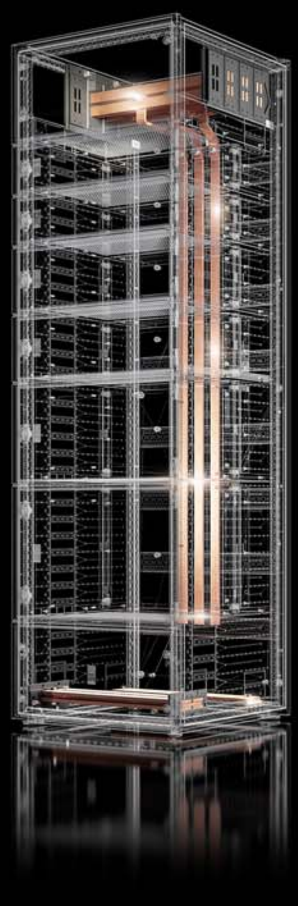
Flexibility
The pre-punched knock-outs in the compartment dividers may be removed without burrs, for flexible division of the openings depending on the planned cable routing and for a consistent, direct power supply to the control and wiring sections.



Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.

Fewer parts
The compartment divider is screw-fastened directly to the side wall and the enclosure section to save time.





Basic framework

- Modular enclosure, 2000 mm high, from the VX25 baying enclosure system
- Base/plinth, 100 mm or 200 mm high, from the VX base/plinth system
- Base/plinth trim panel, side
- Side panel(s)
- Baying with bracket, block or connector
- Partial doors and front trim panels for modular front design
- Door lock(s) from the fastener system
- Roof plate depending on the protection category and function

Compartment

- Compartment side panel
- Compartment dividers
- Partial mounting plates and accessories (depending on the type of Form separation)
- Plastic gland plates
- Terminal box for Form 4b (depending on the type of Form separation)

Busbar system

- Flat copper busbars (Flat-PLS) for main and distributor busbar system and N/PE conductors
- Busbar supports for busbar system in the roof section, for busbar entry or baying
- End cover Flat-PLS
- Longitudinal connector for Flat-PLS
- Connection system for Flat-PLS
- Busbar supports for distribution busbar system
- Connection components for the T-connection
- Accessories for busbar system, such as stabiliser, mounting bracket, screws
- Busbar support, N conductor
- PE/PEN angle bracket
- Perforated cover plate with mounting bracket

VX25 Ri4Power

Modular outgoing feeder section

Modular outgoing feeder sections are used for the installation of circuits with
- Switchgear
- Power supply outgoing feeders
- Controllers, switchgear units
- Fused outgoing feeders
- etc.

in different compartments.
The rated currents can be distributed via integrated distribution busbar systems.

The following bar systems are available for selection as distribution busbar systems (see table 1). The rated currents I_{nc} of the distribution busbar systems are likewise dependent on the protection category and the type of cooling.

Table 1: Rated current I_{nc} of the distribution busbar system in modular outgoing feeder sections

Bar type	Minimum enclosure width		Rated current I_{nc}				Rated short-time withstand current I_{pk}/I_{cw}
	3-pole	4-pole	IP2X ventilation	IP2X	IP54 ventilation	IP54	
9340.000 30 x 5 mm	400 mm	–	400 A	400 A	400 A	400 A	46/22 kA
9340.000 30 x 10 mm	400 mm	–	800 A	800 A	800 A	700 A	76/37 kA
9342.004 PLS 1600	600 mm	600 mm	1800 A	1560 A	1800 A	1520 A	105/50 kA
9686.100 30 x 5 mm	600 mm	600 mm	400 A	400 A	400 A	400 A	57/27 kA
9686.100 1 x 30 x 10 mm	600 mm	600 mm	800 A	800 A	800 A	700 A	105/50 kA
9686.100 2 x 30 x 10 mm	600 mm	600 mm	1800 A	1600 A	1800 A	1570 A	151/65 kA

Table 2: Load figures of partial mounting plates

Model No.	Designation	Size W x H mm	Max. permissible static load daN
9683.561	Partial mounting plate with duct	600 x 150	30
9683.562	Partial mounting plate with duct	600 x 200	30
9683.563	Partial mounting plate with duct	600 x 300	50
9683.564	Partial mounting plate with duct	600 x 400	50
9683.642	Partial mounting plate	400 x 200	30
9683.643	Partial mounting plate	400 x 300	50
9683.644	Partial mounting plate	400 x 400	50
9683.646	Partial mounting plate	400 x 600	90
9683.648	Partial mounting plate	400 x 800	90
9683.660	Partial mounting plate	600 x 1000	90
9683.661	Partial mounting plate	600 x 150	30
9683.662	Partial mounting plate	600 x 200	30
9683.663	Partial mounting plate	600 x 300	50
9683.664	Partial mounting plate	600 x 400	50
9683.666	Partial mounting plate	600 x 600	90
9683.668	Partial mounting plate	600 x 800	90
9683.680	Partial mounting plate	800 x 1000	90
9683.681	Partial mounting plate	800 x 150	30
9683.682	Partial mounting plate	800 x 200	30
9683.683	Partial mounting plate	800 x 300	50
9683.684	Partial mounting plate	800 x 400	50
9683.686	Partial mounting plate	800 x 600	90
9683.688	Partial mounting plate	800 x 800	90

The detailed configuration of the modular outgoing feeder sections should be taken from the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

VX25 Ri4Power

Modular outgoing feeder section

Selection and installation of moulded-case circuit-breakers (MCCB)

The following parameters must be known for the selection of MCCBs:

- The rated current of the circuit I_{nc} which the MCCB must carry under the chosen conditions
- The rated diversity factor RDF for this outgoing feeder or the system
- The protection category of the enclosure and type of cooling
- The design of the MCCB: Rack-mounted, plug-in or static installation
- The number of poles in the MCCB (with switched or unswitched neutral conductor)
- The make and model of the MCCB
- The rated voltage of the circuit
- The required breaking capacity of the MCCB.

With the rated current, the protection category and type of cooling, together with the make and model of the circuit-breaker, you can calculate the required unit size from tables 50 – 57.

With the choice of unit and other mechanical parameters, this produces the minimum size of the enclosure/compartment for installation of the MCCB. This information can likewise be found in tables 50 – 57. For enclosures with internal Form separation, the minimum compartment size is derived from the rated voltage of the circuit.

Testing has verified that moulded-case circuit-breakers from ABB, Eaton, General Electric, Mitsubishi, Schneider Electric, Siemens, LSIS and Terasaki may be used. The information provided in tables 50 – 57 applies to the choice of connection cross-sections. If Rittal has not made any particular stipulations regarding the required clearance at the sides, above and below the circuit-breakers, the equipment manufacturer's specifications should be observed.

A detailed diagram showing connection options for MCCBs can be found in the valid VX25 Ri4Power assembly instructions.

Note:
Table 50 – 57, see page 148 – 171
The equipment manufacturer's specifications must be observed.

Selection and installation of switchgear units

The following parameters must be known for the selection of switchgear units:

- The rated current of the circuit I_{nc} which the switchgear unit must carry under the chosen conditions
- The rated diversity factor RDF for this outgoing feeder or the system
- The protection category of the enclosure and type of cooling
- The design of the switchgear unit (direct starter, star-delta starter, reversing starter)
- The make and model of the switchgear unit
- The rated voltage of the circuit
- The required breaking capacity of the protective device.

Testing has verified that switchgear units from ABB, Eaton, General Electric, LSIS, Mitsubishi, Schneider Electric, Siemens and Terasaki may be used. If Rittal has not made any particular stipulations regarding the required clearance at the sides, above and below the switchgear, the equipment manufacturer's specifications should be observed. The choice of unit is specific to each brand.

Switchgear units:
The protective device of a switchgear unit should be selected as follows in order to comply with testing requirements:
The rated current I_{nc} of the chosen switchgear assembly must not exceed 80% of the rated current of the protective device. The breaking capacity of the protective device must be greater than or equal to the possible short-circuit current at the connection point.

The connection cable of the switchgear to the superordinate bar system must be 2 cross-sectional sizes greater than that designed for a purely thermal current load as per Appendix H of IEC 61 439-1. The choice of cables and laying conditions must be designed as short circuit-protected wiring in accordance with IEC 61 439-1 (see also table 29, page 113). Insulation of the connection cables between the protective device and the superordinate busbar system and the other devices in the main circuit must withstand an overtemperature of 70 K.

The switchgear must correspond to the connected equipment as per their switching category. The rated current I_{nc} of the chosen switchgear assembly must not exceed 80% of the rated current of the switchgear. The switching capacity of the switchgear must be greater than or equal to the on-state values of the corresponding protective device. The connection cable of the switchgear to the terminal connection must be one cross-sectional size greater than that designed for a purely thermal current load as per Appendix H of IEC 61 439-1.

The connection clamps must be designed for the inner and outer wiring of the switchgear unit.

A detailed diagram showing connection options for switchgear and protective gear can be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

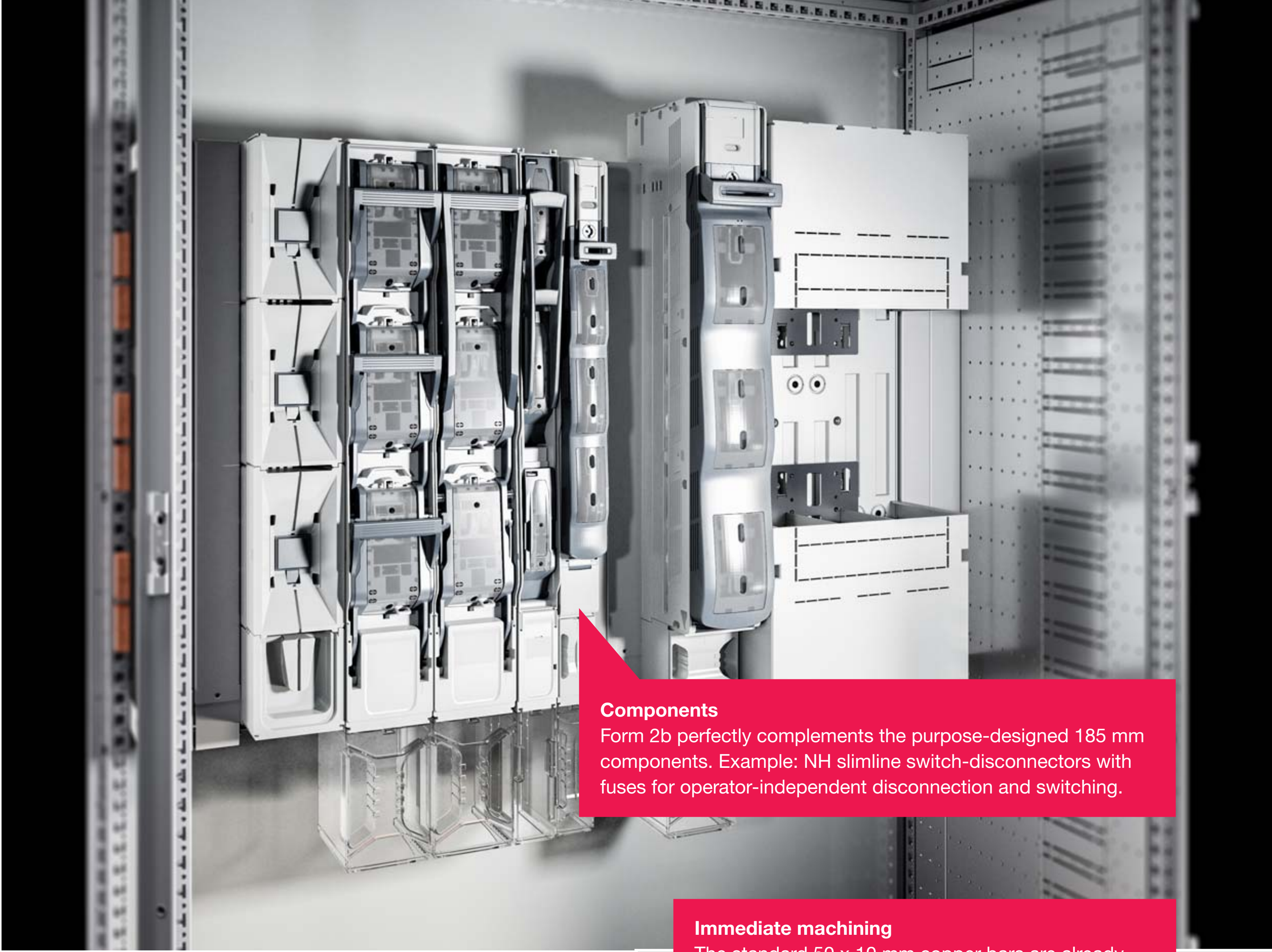
FORM 2B

To ensure optimum contact hazard protection
The Form 2b designed as internal separation shields the busbar compartment from the functional space and the connection space.

- All active parts are safe from finger-contact in line with IP 2X.
- When working in the functional space or connection space, the modular, width-flexible cover provides effective protection from contact with the busbars.
- Shielding to Form 2b also protects the equipment, by preventing the unwanted ingress of foreign bodies into the busbar compartment.
- Convenient plug-in and clip-in technology enables simple assembly of all components with no drilling required.

Fast assembly
Component installation and finger-proof shielding is achieved by simply screw-fastening; no drilling required.

Modular benefits
The width of the contact hazard protection cover is easily adjusted thanks to its 50 mm subdivision and is always flush with the compartment side panel, in line with the Rittal system dimensions.

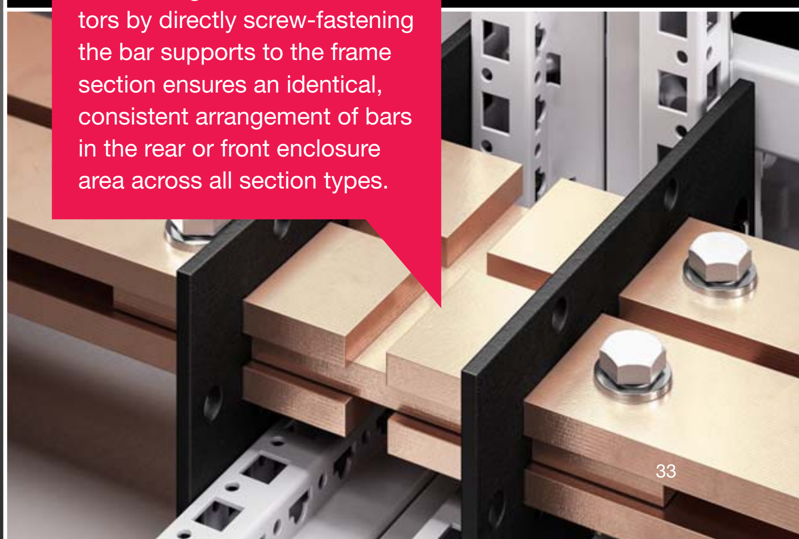


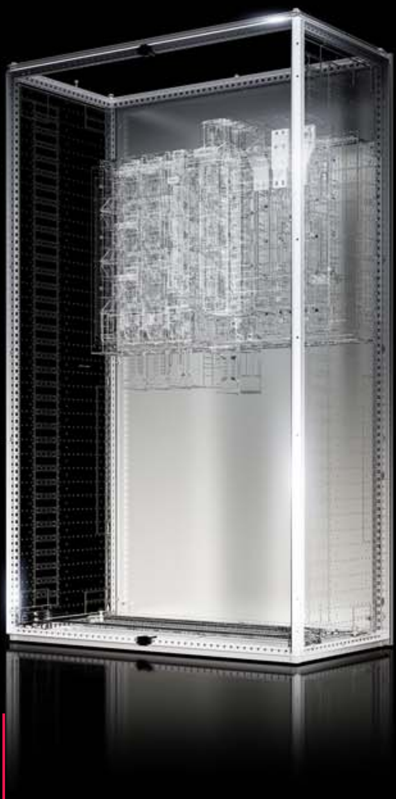
Components
Form 2b perfectly complements the purpose-designed 185 mm components. Example: NH slimline switch-disconnectors with fuses for operator-independent disconnection and switching.

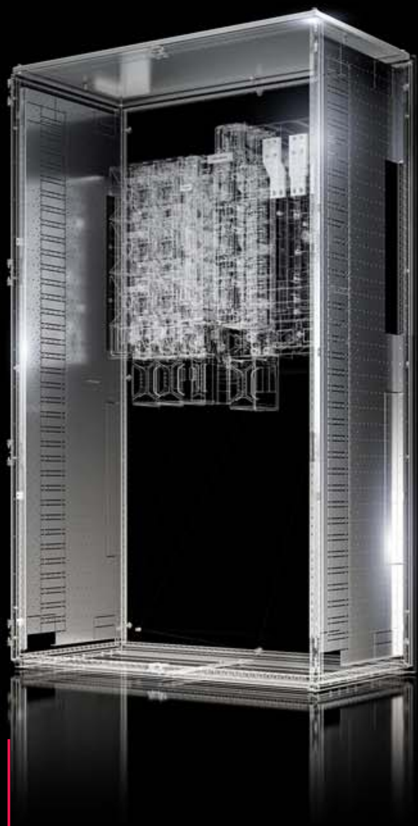
Immediate machining
The standard 50 x 10 mm copper bars are already pre-punched and cut to the required length to match the enclosure widths. They may be fitted directly without machining.

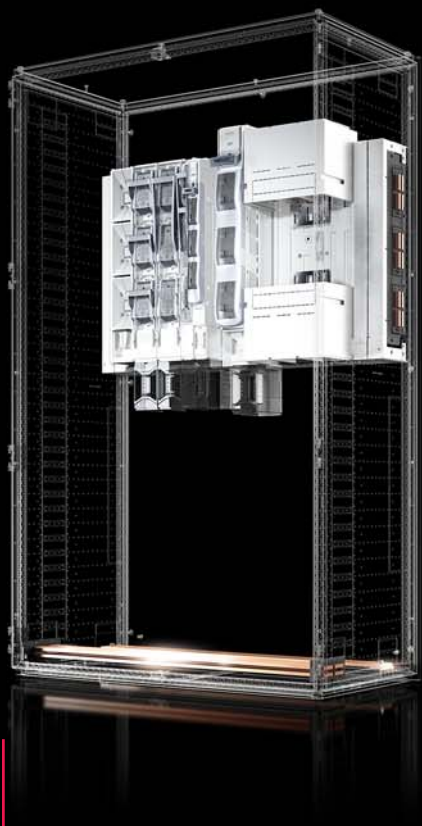
Fast attachment
The busbar support is secured to the enclosure section using just two screws. A pre-punched knock-out is provided so that a matching cut-out can be made quickly in the compartment side panel.

Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.









Basic framework

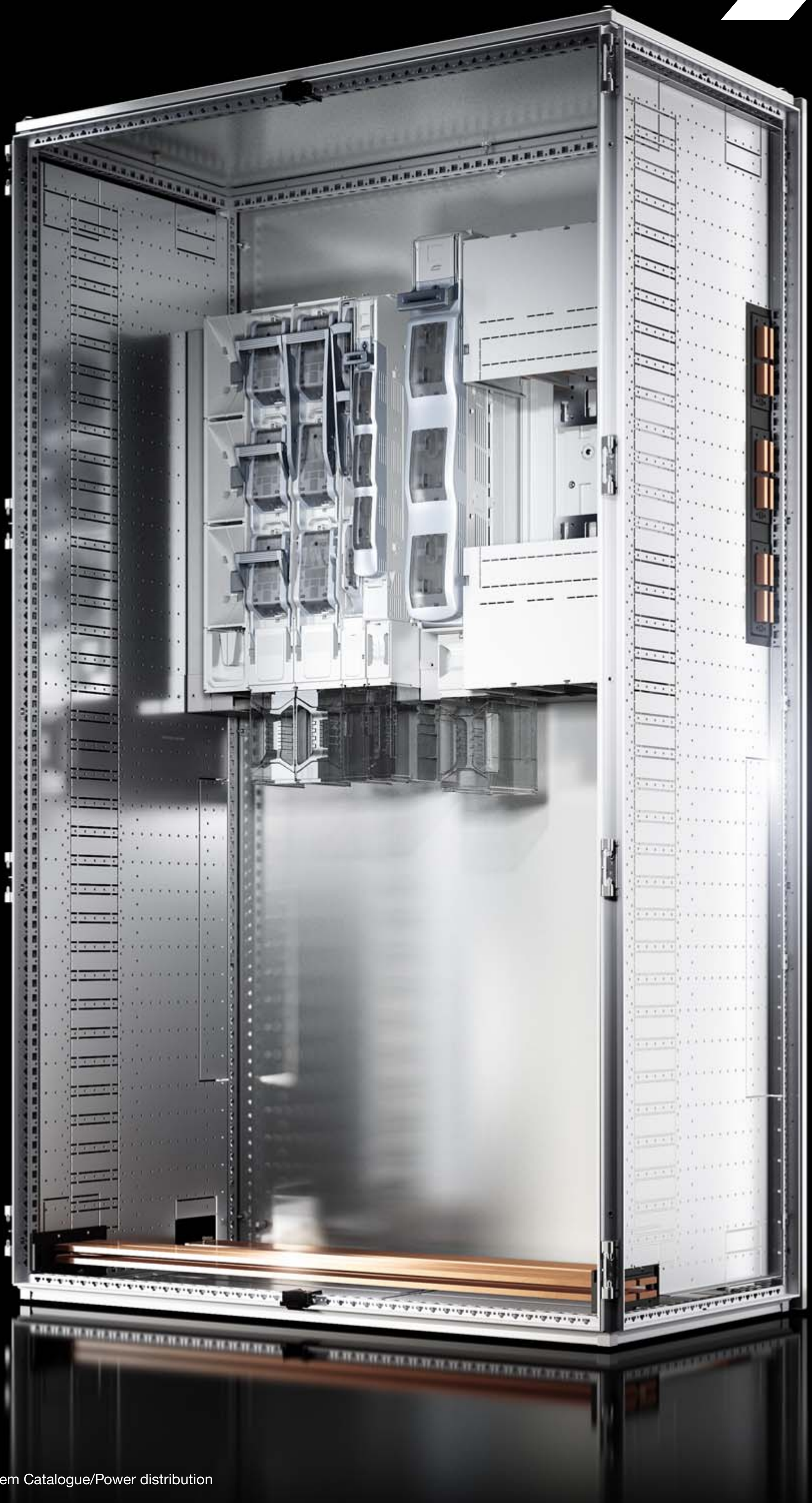
- Modular enclosure, 2000 mm high, from the VX25 baying enclosure system
- Base/plinth, 100 mm or 200 mm high, from the VX base/plinth system
- Base/plinth trim panel, side
- Side panel(s)
- Baying with bracket, block or connector
- Partial doors and front trim panels for modular front design
- Door lock(s) from the fastener system
- Roof plate depending on the protection category and function

Compartment

- Compartment side panel
- Contact hazard protection cover for Form 2b
- Blanking cover for contact hazard protection cover

Busbar system

- Flat copper busbars (Flat-PLS) for main busbar system and N/PE conductors
- Busbar supports for busbar system in the rear section, for busbar entry or baying
- End cover Flat-PLS
- Longitudinal connector for Flat-PLS
- Accessories for busbar system, such as stabiliser, mounting bracket, screws
- Busbar support, N conductor
- PE/PEN angle bracket
- Perforated cover plate with mounting bracket



VX25 Ri4Power

Fuse-switch disconnector section

The fuse-switch disconnector sections for NH slimline fuse-switch disconnectors with 185 mm bar centre distance on horizontal busbar systems in the rear section have only been tested by Rittal with Rittal NH slimline fuse-switch disconnectors and meet the requirements of IEC 61 439-2.

It is possible to use NH slimline fuse-switch disconnectors from other manufacturers. However, these have not been tested to the standard by Rittal.

The maximum admissible rated operating current of the NH slimline fuse-switch disconnectors with due regard for the NH fuse insert used and the minimum connection cross-section may be taken from table 3 below.

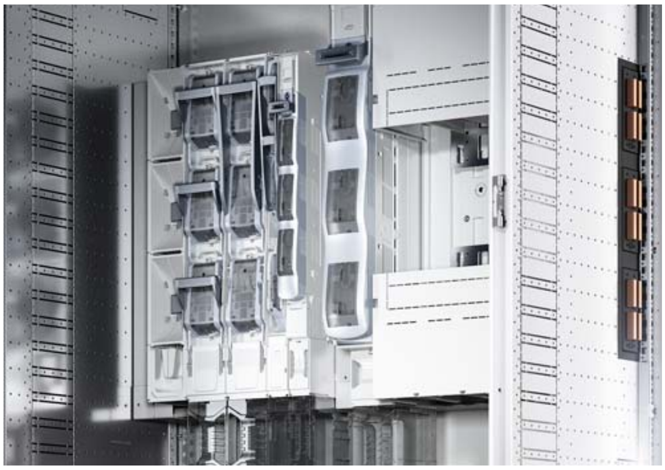


Table 3: Rating data for NH slimline fuse-switch disconnectors

Size	Max. device rated current I_n	Rated current of fuse I_{n1}	Max. rated current I_{nc}	Minimum connection cross-section
Size 00	160 A	up to 20 A	$= I_{n1}$	2.5 mm^2
Size 00	160 A	25 A	$= I_{n1}$	4 mm^2
Size 00	160 A	35 A	$= I_{n1}$	6 mm^2
Size 00	160 A	50 A	$= I_{n1}$	10 mm^2
Size 00	160 A	63 A	$= I_{n1}$	16 mm^2
Size 00	160 A	80 A	$= I_{n1}$	25 mm^2
Size 00	160 A	100 A	$= I_{n1}$	35 mm^2
Size 00	160 A	125 A	$= I_{n1}$	50 mm^2
Size 00	160 A	160 A	$= I_{n1}$	70 mm^2
Size 1	250 A	160 A	$= I_{n1}$	Cf. size 00
Size 1	250 A	224 A	$= I_{n1}$	95 mm^2
Size 1	250 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	200 A	$= I_{n1}$	Cf. size 00 – 1
Size 2	400 A	224 A	$= I_{n1}$	120 mm^2
Size 2	400 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	315 A	$= I_{n1}$	185 mm^2
Size 2	400 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	315 A	$= I_{n1}$	Cf. size 00 – 2
Size 3	630 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	500 A	$= I_{n1}$	2 x 185 mm^2
Size 3	630 A	630 A	$= I_{n1}$	2 x 240 mm^2

VX25 Ri4Power

Fuse-switch disconnector section

The admissible rated operating current I_{nc} of the installed devices depends on the type of protection of the system and the number of devices. Details can be taken from the following table.

Table 4: Data table of the rated values for currents

Model No.	Designation	Type	Device I_n		IP2X vent.[1)]	IP2X	IP54 vent.[1)]	IP54	Heat loss device
SV 9677.770	Adaptor ABB[2)]	XT5L	630	I_{cc} 100 kA	630	530	630	490	–
SV 9677.710	Adaptor ABB[2)]	XT7	1600	I_{cc} 70 kA	1440	1200	1440	1100	–
SV 9677.770	Adaptor Eaton[2)]	NZM3	630	I_{cc} 100 kA	630	580	630	550	–
SV 9677.710	Adaptor Eaton[2)]	NZM4	1600	I_{cc} 85 kA	1540	1370	1540	1220	–
SV 9677.770	Adaptor Schneider Electric[2)]	NSX630	630	I_{cc} 100 kA	630	580	630	550	–
SV 9677.700	Adaptor Schneider Electric[2)]	NS1000	1000	I_{cc} 100 kA	1000	1000	1000	990	–
SV 9677.710	Adaptor Schneider Electric[2)]	NS1600	1600	I_{cc} 70 kA	1390	1240	1390	1075	–
SV 9677.770	Adaptor Siemens[2)]	3VA2463	630	I_{cc} 100 kA	630	550	630	525	–
SV 9677.710	Adaptor Siemens[2)]	3VA2716	1600	I_{cc} 100 kA	1460	1100	1460	980	–
SV 9677.000/010	Fuse-switch disconnector, single[3)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	28
SV 9677.100/110	Fuse-switch disconnector, single[3)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	24
SV 9677.200/210	Fuse-switch disconnector, single[3)]	NH 2	400	I_{cc} 100 kA	400	375	400	335	60
SV 9677.300/310	Fuse-switch disconnector, single[3)]	NH 3	630	I_{cc} 100 kA	630	555	630	490	118
SV 9677.000/010	Fuse-switch disconnector, group[2)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	28
SV 9677.100/110	Fuse-switch disconnector, group[2)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	24
SV 9677.200/210	Fuse-switch disconnector, group[2)]	NH 2	400	I_{cc} 100 kA	400	360	400	310	60
SV 9677.300/310	Fuse-switch disconnector, group[2)]	NH 3	630	I_{cc} 100 kA	630	470	630	420	118
SV 9677.06X/07X	Slimline switch-disconnector, single[3)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	55
SV 9677.16X	Slimline switch-disconnector, single[3)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	80
SV 9677.26X	Slimline switch-disconnector, single[3)]	NH 2	400	I_{cc} 100 kA	400	400	400	385	220
SV 9677.36X	Slimline switch-disconnector, single[3)]	NH 3	630	I_{cc} 100 kA	630	580	630	550	250
SV 9677.06X/07X	Slimline switch-disconnector, group[2)]	NH 00	160	I_{cc} 100 kA	160	160	160	130	55
SV 9677.16X	Slimline switch-disconnector, group[2)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	80
SV 9677.26X	Slimline switch-disconnector, group[2)]	NH 2	400	I_{cc} 100 kA	400	365	400	315	220
SV 9677.36X	Slimline switch-disconnector, group[2)]	NH 3	630	I_{cc} 100 kA	630	510	630	380	250
SV 9677.900	Connection adaptor[2)]	800	800	I_{peak} 52 kA	800	770	800	710	270
SV 9677.905	Connection adaptor[2)]	1400	1400	I_{peak} 107 kA I_{cw} 40 kA	1400	1130	1400	1070	550

1) For Form 1, fan-and-filter unit SK 3244.100 is required (one unit per door) to reach the values indicated in the table. For modular front design, one 300 mm high trim panel (IP54) is required for the installation of fan-and-filter unit SK 3241.100.
2) Rated operating current of a main circuit I_{ng}
3) Rated current of an outgoing main circuit I_{nc}

Enclosure depth and enclosure height are irrelevant to the diversity of the section outgoing feeders. Consequently, the section dimensions may be selected independently of the section diversity. Fuse-switch disconnector sections with horizontal busbar system from the VX25 Ri4Power modular system consist of VX25 enclosures and other required system accessories. The main busbar system may only be installed in the rear section. The neutral conductor should always be positioned offset from the main busbar system in the lower enclosure section.

The detailed configuration of the fuse-switch disconnector sections can be found in the valid VX25 Ri4Power assembly instructions.

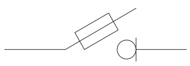
Note:
The equipment manufacturer's specifications must be observed.

Fuse-switch disconnector section

Table 5: NH slimline fuse-switch disconnectors, size 00 to 3 (185 mm)

Model No.		9677.000 9677.025	9677.010	9677.100	9677.110	9677.200 9677.210	9677.300	9677.310	9677.340
Size (NH fuse inserts to IEC/EN 60 269-2)		00	00	1	1	2	3	3	3
Rated operating current I_e		160 A	160 A	250 A	250 A	400 A	630 A	630 A	1250 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV
Contamination level		3	3	3	3	3	3	3	3
Overvoltage category at 1000 V		III	III	III	III	III	III	III	III
Overvoltage category at 690 V		IV	IV	IV	IV	IV	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	100 kA	100 kA	120 kA	120 kA	120 kA	100 kA	100 kA	100 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA	100 kA	80 kA	80 kA	80 kA
	at 800 V AC	30 kA[1]	–	50 kA[3]	–	–	50 kA[4]	–	–
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-20B
	500 V AC	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-20B
	690 V AC	AC-21B[2]	AC-21B[2]	AC-22B	AC-22B	AC-22B	AC-21B[5]	AC-21B[5]	AC-20B
	800 V AC	AC-22B[1]	–	AC -22 [3]	–	AC-20B	AC-22B[4]	–	DC-20B
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	–
Mechanical life (switching cycles)		1400	1400	1400	1400	800	800	800	800
Contact hazard protection – operating area max.		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60 947-1, section 6 and pollution degree 3							
Admissible ambient temperature for shipping and storage		-25 °C…+55 °C							
PV max/fuse insert		12 W	12 W	23 W	23 W	34 W	48 W	48 W	48 W

[1] Size 00 (63 A, gG)
[2] Size 00 (125 A, gG)
[3] Size 1 (160 A, gG)
[4] Size 3 (315 A, gG)
[5] Size 3 (500 A, gG)

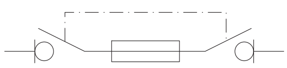


Fuse-switch
Single break

Table 6: NH slimline switch-disconnectors, size 00 to 3 (185 mm)

Model No.		9677.060 9677.070	9677.160	9677.260 9677.265	9677.360
Size (NH fuse inserts to IEC/EN 60 269-2)		00	1	2	3
Rated operating current I_e		160 A	250 A	400 A	630 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	12 kV	12 kV	12 kV
Contamination level		3	3	3	3
Overvoltage category at 1000 V		IV	IV	IV	IV
Overvoltage category at 690 V		III	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	120 kA	120 kA	120 kA	120 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA
	at 800 V AC	30 kA[1]	50 kA[2]	–	50 kA[3]
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	500 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	690 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	800 V AC	AC-22B[1]	AC-22B[2]	–	AC-22B[3]
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B[4]
Mechanical life (switching cycles)		1400	1400	800	800
Contact hazard protection – operating area max.		IP30	IP30	IP30	IP30
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60 947-1, section 6 and pollution degree 3			
Admissible ambient temperature for shipping and storage		-25 °C…+55 °C			
PV max/fuse insert		12 W	32 W	45 W	48 W

[1] Size 00 (63 A, gG)
[2] Size 1 (160 A, gG)
[3] Size 3 (315 A, gG)
[4] Size 3 (500 A, gG)



Fuse-switch
Double break

VX25 Ri4Power

Fuse-switch disconnector section

Table 7: NH slimline switch-disconnectors, size 00 to 3 (185 mm)

Model No.		9677.065 9677.075	9677.165	9677.265	9677.365
Size (NH fuse inserts to IEC/EN 60 269-2)		00	1	2	3
Rated operating current I_e		160 A	250 A	400 A	500 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	12 kV	12 kV	12 kV
Contamination level		3	3	3	3
Overvoltage category at 1000 V		IV	IV	IV	IV
Overvoltage category at 690 V		III	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	120 kA	120 kA	120 kA	120 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA
	at 800 V AC	30 kA[1]	50 kA[2]	–	50 kA[3]
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	500 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	690 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	800 V AC	AC-22B[1]	AC-22B[2]	–	AC-22B[3]
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B[4]
Mechanical life (switching cycles)		1400	1400	800	800
Contact hazard protection – operating area max.		IP30	IP30	IP30	IP30
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60 947-1, section 6 and pollution degree 3			
Admissible ambient temperature for shipping and storage		-25 °C…+55 °C			
PV max/fuse insert		12 W	32 W	45 W	48 W

[1] Size 00 (63 A, gG)
[2] Size 1 (160 A, gG)
[3] Size 3 (315 A, gG)
[4] Size 3 (500 A, gG)

Fuse-switch
Double break

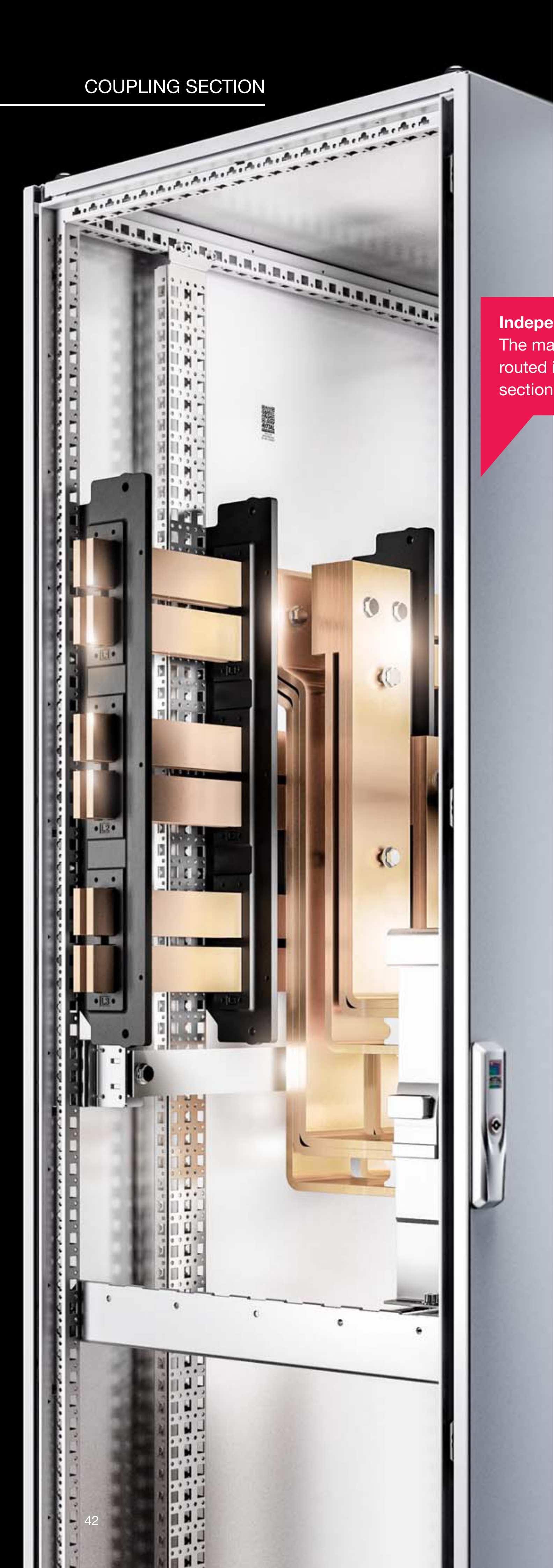
VX25.
SYSTEM PERFECTION.

THE COUPLING SECTION

For maintaining fail-safe operation

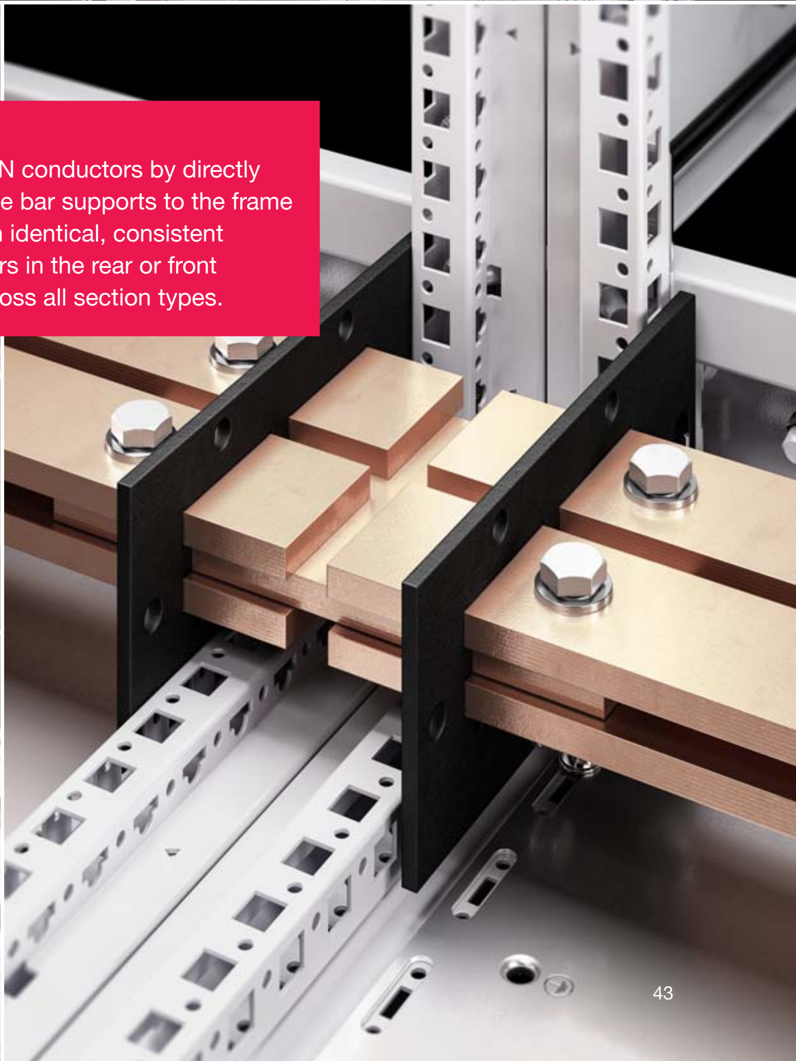
The coupling section is a combination of an air circuit-breaker section with a busbar riser positioned optionally on the left or right.

- This allows individual busbar sections to be de-energised without switching off the entire system. This avoids total system failures during malfunctions or maintenance work, and maintains system availability, especially for systems with multiple power supplies.
- With the VX25 Ri4Power, comprehensive, stable partitioning allows busbar sections to be safely disconnected. The high safety standards of the coupling section permit less stringent requirements for overall short-circuit resistance.
- The parts, accessories and required work steps are largely the same as when assembling the circuit-breaker section. The system synergies mean that assembly time is significantly reduced, while also offering major cost-saving potential.

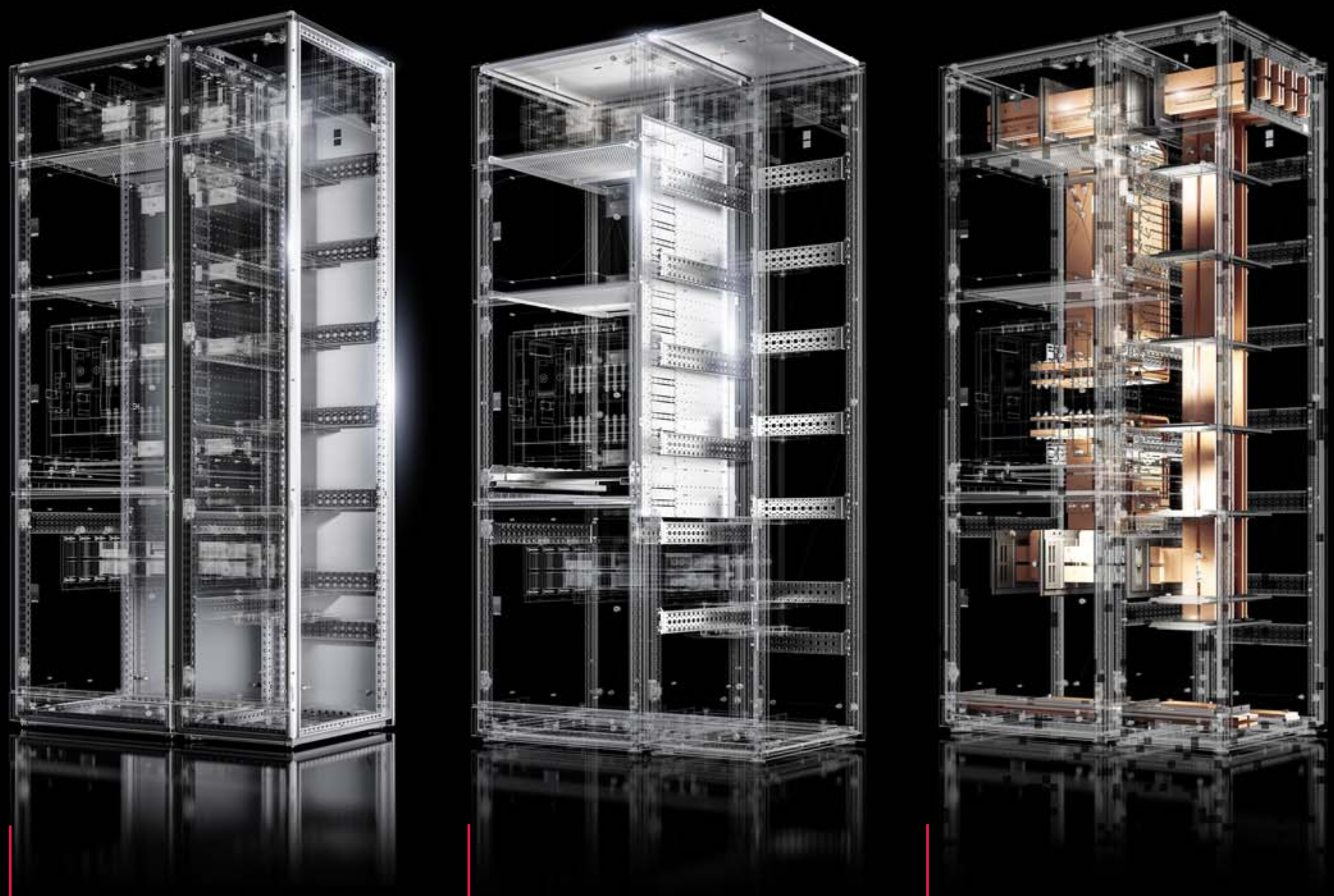


Independence
The main busbars may optionally be routed in the roof section or central rear section.

Modular benefits
The coupling power infeed towards the roof section is always based on the same side riser. It is always identical, regardless of whether it is integrated into a coupling section or accommodated in another enclosure as a separate section.



Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.



Basic framework

- Modular enclosure 2000 mm high, from the VX25 baying enclosure system (for coupling section and additional riser section)
- Base/plinth, 100 mm or 200 mm high, from the VX base/plinth system
- Base/plinth trim panel, side
- Side panel(s)
- Baying with bracket, block or connector
- Partial doors and front trim panels for modular front design
- Door lock(s) from the fastener system
- Roof plate depending on the protection category and function
- Cable entries

Compartment

- Compartment side panel
- Compartment dividers
- Partial mounting plates and accessories (depending on the type of Form separation)
- Air circuit-breaker mounting bracket and support rail

Busbar system

- Flat copper busbars (Flat-PLS) for main and riser busbar system and N/PE conductors
- Busbar supports for busbar system in roof or rear area, or for busbar extension
- Punched section without mounting flange for busbar supports in the riser section
- End cover Flat-PLS
- Longitudinal connector for Flat-PLS
- Connection system for Flat-PLS
- Connection components for air circuit-breakers on the busbar system or for T-connection
- Accessories for busbar system, e.g. stabiliser, mounting bracket, screws
- Busbar support, N conductor
- PE/PEN angle bracket
- Perforated cover plate with mounting bracket

Coupling section

Coupling switch sections (also known as busbar couplings with air circuit-breakers ACB) separate or connect different busbar systems in low-voltage switchgear and controlgear assemblies. In the VX25 Ri4Power modular system, these coupling switch sections are comprised of a riser section and a circuit-breaker section for ACBs.

Due to the similarity of the two section types, the following selection criteria are virtually identical to those for a circuit-breaker section.

The following parameters must be known for dimensioning of the coupling switch sections for air circuit-breakers (ACBs):

- The rated current of the circuit I_{nc} which the coupling switch section must carry under the chosen conditions
- The protection category of the enclosure and type of cooling
- The design of the ACB: Rack-mounted or static installation
- The number of poles in the coupling switch (with switched or unswitched neutral conductor)
- The make and model of the ACB
- The mounting position of the ACB
- The rated voltage of the circuit
- The required short-circuit withstand strength for the coupling switch.

With the rated current of the circuit, the protection category and type of cooling, together with the make and model of the ACB, you can calculate the required unit size from tables 42 – 49.

With the choice of unit and other mechanical parameters, this produces the minimum size of the enclosure for the circuit-breaker section. This information can likewise be found in tables 42 – 49. For enclosures with internal Form separation, the minimum compartment height is derived from the rated voltage of the unit.

The mounting position of the ACB is divided into:

- Position VT (in front of door), i.e. the control components are facing outwards from the enclosure door, thus allowing the ACB to be operated without opening the enclosure door.
- Position HT (behind the door) means that the ACB including the control components are completely inside the enclosure.

This means that for some switchgear positioned in front of the door, a version with a 600 mm enclosure depth would be possible, whereas for versions behind the door, only 800 mm deep enclosures are possible. A further restriction arises when using busbar systems in the rear section. Due to the set forward position of the connection kit of the main busbar system in relation to the ACB, some versions might only be possible in 800 mm deep enclosures, whereas with main busbar systems in the roof or rear centre section, a 600 mm deep enclosure would also be possible.

In addition to the ACB, control and measurement equipment with a maximum heat loss of 50 W may be installed in the coupling switch section.

The size of the riser section is derived from the chosen main busbar system.

Coupling switch sections for the roof area from the modular VX25 Ri4Power system are comprised of VX25 enclosures with Form-separated, variable configuration with partial doors and inner compartmentalisation in a modular design and other required system accessories. Testing has verified that air circuit-breakers from ABB, Eaton, General Electric, Mitsubishi, Schneider Electric, Siemens, LSIS and Terasaki may be used. Coupling switch sections with rear centre section only have an internal Form separation in Form 1. The information provided in tables 42 – 49 in the Appendix applies to the choice of connection cross-sections. If Rittal has not made any particular stipulations regarding the required clearance at the sides, above and below the circuit-breakers, the equipment manufacturer's specifications should be observed.

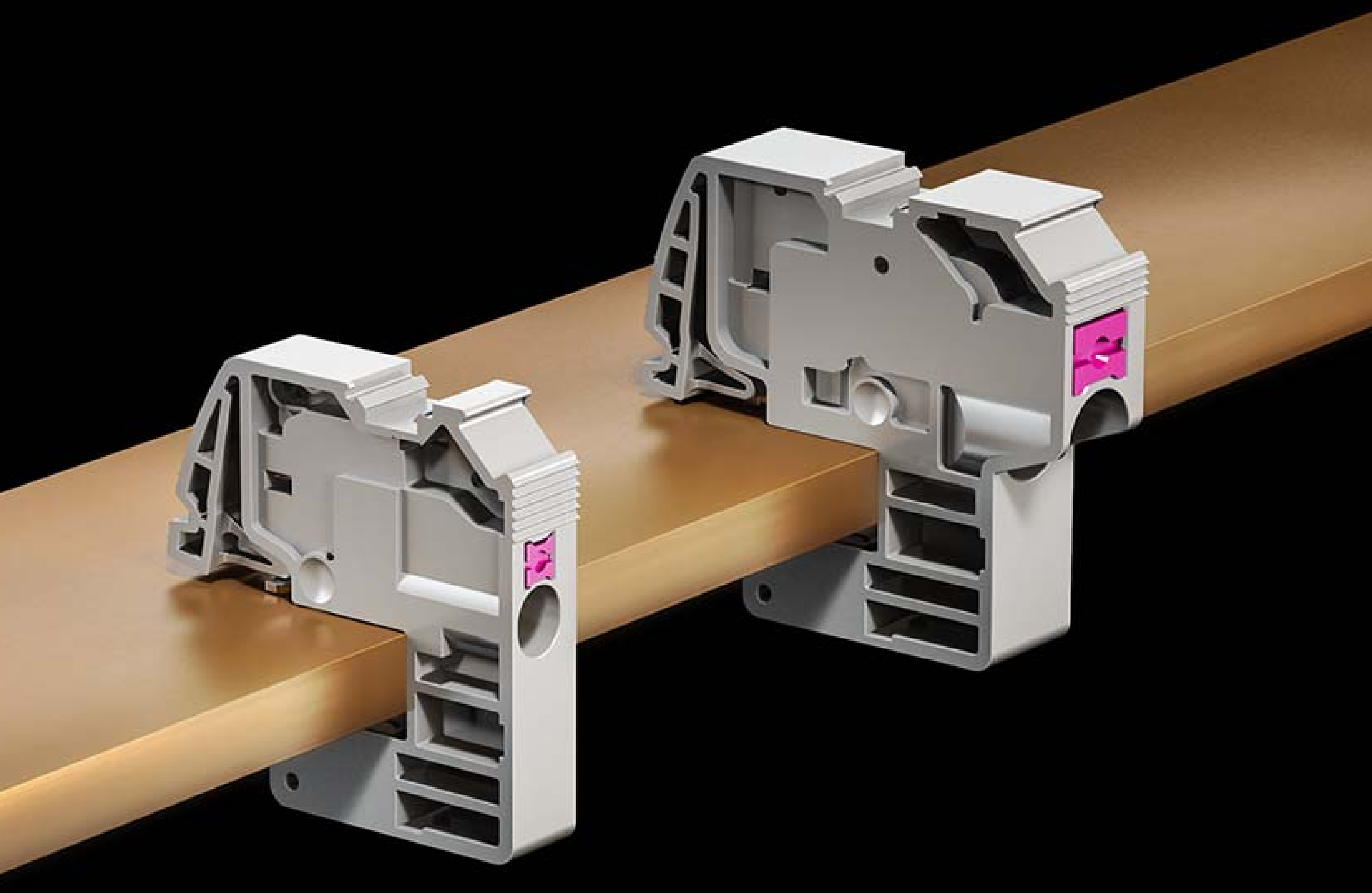
The main busbar system may optionally be installed in the roof or rear centre section. When using partial doors, front trim panels with a protection category as per the technical specifications should be used for the upper and lower termination of the modular equipment.

The detailed configuration of the coupling switch sections can be found in the valid VX25 Ri4Power assembly instructions.

Note:
Table 42 – 49, see page 132 – 147
The equipment manufacturer's specifications must be observed.

Push-in conductor connection clamps

Simple, tool-free cable connection



VX25.
SYSTEM
PERFECTION.

THE FUSE-SWITCH DISCONNECTOR SECTION

For a reliable power supply
Distributing electrical energy as compactly as possible with maximum variability using fused switchgear – that is the task of the fuse-switch disconnector section.

- The VX25 Ri4Power modular switchgear system is fully prepared for fast, safe installation of fuse-switch disconnectors, sizes 00 to 3, from Jean Müller or ABB/Siemens.
- The distribution busbars are economically dimensioned to meet the individual requirements. The main and distribution busbar systems can be configured for a short-circuit rating of up to 100 kA for 1 sec.
- Form 1 to Form 4b internal sub-division in the fuse-switch disconnector section, depending on customer requirements, is achieved via the optional selection of components.

THE CABLE CHAMBER

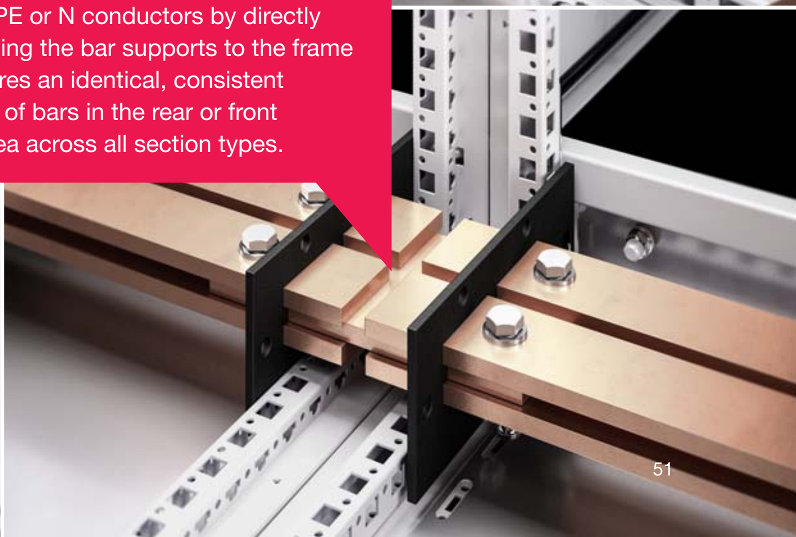
For distributing cables and lines
The cable chamber is used for routing cables and lines to the compartments.

- The extensive range of VX25 Ri4Power system accessories ensures exceptionally time-saving and flexible configuration.
- Depending on the main busbar system chosen, cable entry may be either from below, above, or below and above.
- Choose from a range of cable entry glands for the roof plate.

Universal benefit
One single section type is sufficient for all horizontal fuse-switch-disconnector types.

Planning confidence
The positioning of the vertical section is identical for all fuse-switch-disconnector types. This means the system is fully planned and implemented independently of the fuse-switch-disconnector manufacturer that is subsequently chosen.

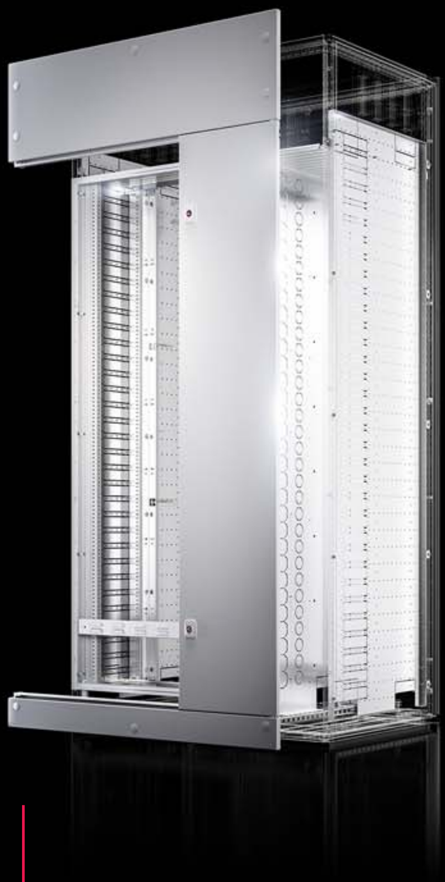
Combination benefits
The fuse-switch disconnector section is available with integral cable chamber, fully pre-configured, including partitioning.
No additional accessories are required.
Benefits: Space-efficient and time-saving.



Continuity
Connecting PE or N conductors by directly screw-fastening the bar supports to the frame section ensures an identical, consistent arrangement of bars in the rear or front enclosure area across all section types.

Basic framework

- Fuse-switch disconnector enclosure, 2000 mm high, from the VX25 baying enclosure system
- Base/plinth, 100 mm or 200 mm high, from the VX base/plinth system
- Base/plinth trim panel, side
- Side panel(s)
- Baying with bracket, block or connector
- Door lock(s) from the fastener system
- Cable entries

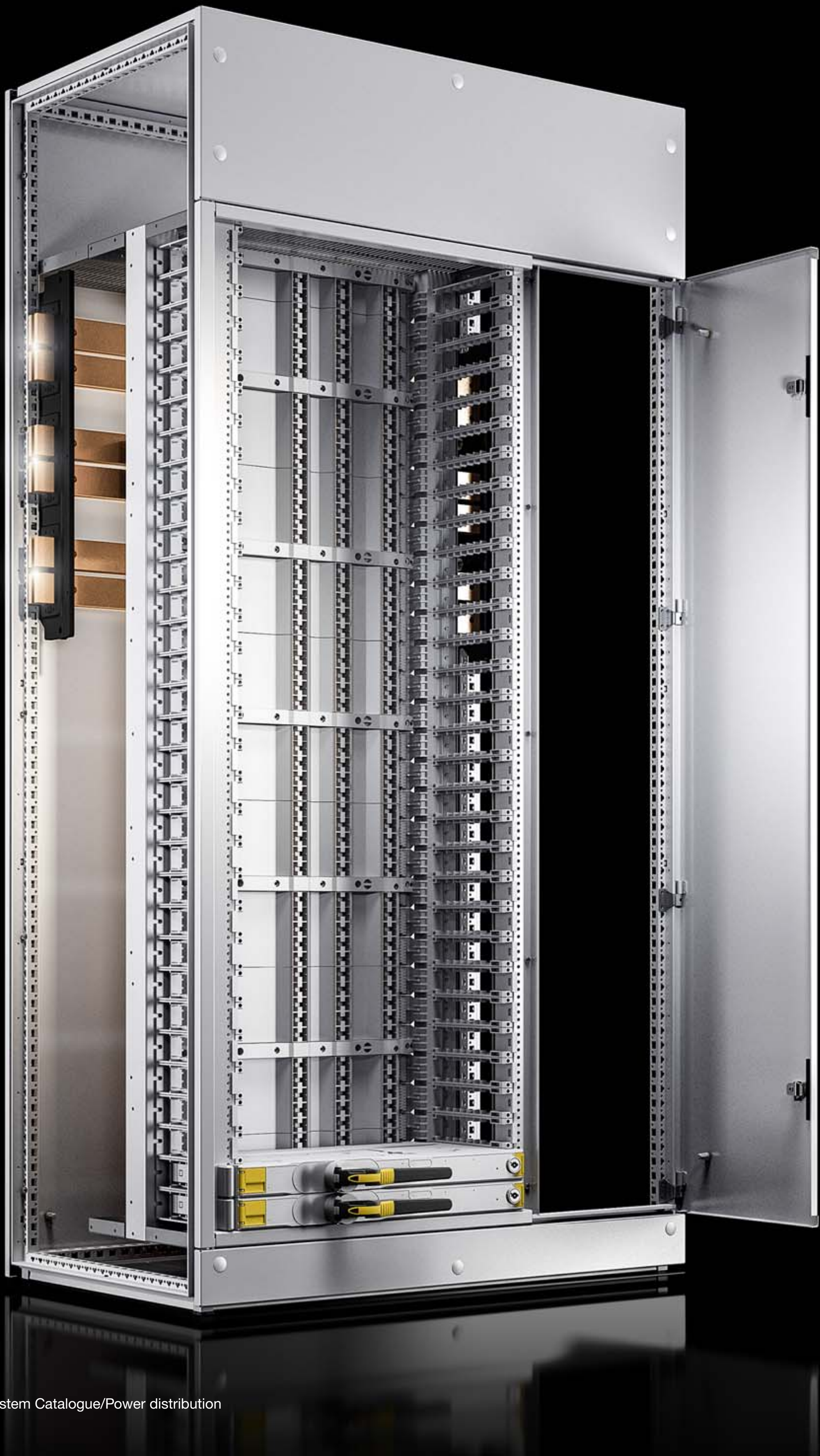


Compartment

- Supplied already populated

Busbar system

- Flat copper busbars (Flat-PLS) for main and distributor busbar system and N/PE conductors
- Busbar supports for busbar system in roof or rear section
- Busbar support, end bracket and cover for fuse-switch disconnector section
- End cover Flat-PLS
- Longitudinal connector for Flat-PLS
- Connection components for T-connector
- Busbar support, N conductor
- PE/PEN angle bracket
- Perforated cover plate with mounting bracket



Fuse-switch disconnector section

The fuse-switch disconnector sections with vertical distribution busbar systems are suitable for accommodating plug-type NH slimline fuse-switch disconnectors of the following brands:

- ABB, type Slimline XR and XR gold
- Jean Müller, type Sasil plus symmetrical
- Siemens, type 3NJ

and

- Device modules from Jean Müller

The distribution busbar system may be configured with the following bar dimensions (see table 8). Resulting from this, the allocated rated currents I_{nc} with a maximum protection category IP3X for this section type may be used:

Table 8: Rated current I_{nc} and short-circuit withstand strength I_{cw} of the vertical distribution busbar in the NH slimline fuse-switch disconnector section

Dimensions of busbars	Max. rated current: I_{nc}	Rated short-circuit withstand strength I_{cw} with support spacing 300 mm	Rated short-circuit withstand strength I_{cw} with support spacing 500 mm
60 x 10 mm	1250 A	75 kA, 1 sec.	50 kA, 1 sec.
80 x 10 mm	1600 A	85 kA, 1 sec.	60 kA, 1 sec.
100 x 10 mm	2100 A	100 kA, 1 sec.	70 kA, 1 sec.

The rated currents I_{nc} also apply to the protection category IP2X. The switchgear manufacturer's current specifications determine the maximum packaging density when populated with NH slimline fuse-switch disconnectors. The NH slimline fuse-switch disconnectors sizes 00 to 3 should be arranged from top to bottom (top = small sizes).

The maximum admissible rated operating current of the NH slimline fuse-switch disconnectors depending on the NH fuse insert used and the minimum connection cross section may be taken from the table below.

Table 9: Rating data for NH slimline fuse-switch disconnectors from ABB/Jean Müller

Size	Max. device rated current I_n	Rated current of fuse I_{n1}	Max. rated current I_{nc}	Minimum connection cross-section
Size 00	160 A	up to 20 A	$= I_{n1}$	2.5 mm^2
Size 00	160 A	25 A	$= I_{n1}$	4 mm^2
Size 00	160 A	35 A	$= I_{n1}$	6 mm^2
Size 00	160 A	50 A	$= I_{n1}$	10 mm^2
Size 00	160 A	63 A	$= I_{n1}$	16 mm^2
Size 00	160 A	80 A	$= I_{n1}$	25 mm^2
Size 00	160 A	100 A	$= I_{n1}$	35 mm^2
Size 00	160 A	125 A	$= I_{n1}$	50 mm^2
Size 00	160 A	160 A	$= I_{n1}$	70 mm^2
Size 1	250 A	160 A	$= I_{n1}$	Cf. size 00
Size 1	250 A	224 A	$= I_{n1}$	95 mm^2
Size 1	250 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	200 A	$= I_{n1}$	Cf. size 00 – 1
Size 2	400 A	224 A	$= I_{n1}$	120 mm^2
Size 2	400 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	315 A	$= I_{n1}$	185 mm^2
Size 2	400 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	315 A	$= I_{n1}$	Cf. size 00 – 2
Size 3	630 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	500 A	$= I_{n1}$	2x 150 mm^2
Size 3	630 A	630 A	$= I_{n1}$	2x 185 mm^2

VX25 Ri4Power

Fuse-switch disconnector section

The rated diversity factors are calculated according to the number of outgoing feeders used per section (in accordance with IEC 61 439-2, table 101).

Table 10: Rated diversity factor RDF of NH slimline fuse-switch disconnectors from ABB/ Jean Müller depending on the number of NH slimline fuse-switch disconnectors per section

No. of NH slimline fuse-switch disconnectors	Rated diversity factor RDF
2 and 3	0.9
4 and 5	0.8
6 to 9	0.7
10 or more	0.6

The enclosure depth and enclosure height are irrelevant to the diversity of the section outgoing feeders. The section dimensions and the width of the cable chamber may therefore be selected independently of the section diversity.

Depending on the main busbar system chosen, it may be necessary to use enclosures with an enclosure depth of 800 mm.

Fuse-switch disconnector sections with a vertical distribution busbar system from the modular VX25 Ri4Power range are comprised of VX25 enclosures with Form-separated, variable configuration and inner compartmentalisation in a modular design and other required system accessories.

In line with testing to the valid standard, only the aforementioned brands may be used.

The main busbar system may optionally be installed in the roof or rear centre section.

The detailed configuration of the fuse-switch disconnector sections with vertical distribution busbar system may be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

Cable chamber

The cable chamber is designed for the cable management of outgoing feeder sections. Bayed to the side of the modular enclosure, it is used to route the cables and also for insertion into the individual compartments. The cable chamber may also be used independently of the modular enclosure inside VX25 Ri4Power systems for general cable management.

The use of Form 4b connection spaces is mandatory for compliance with Form 4b. Form 4b connection spaces are fitted onto the side panel modules of the compartments of modular outgoing feeder sections. For this reason, when planning a combination of a modular outgoing feeder section and a cable chamber, it is expedient to consider them as one transport unit.

For inner compartmentalisation with Form 2b, 3b, 4a and 4b, the main busbar system routed through the cable chamber should be separated by covers. Depending on the configuration of the entire system, the main busbar system of the cable chamber may be routed in the roof section.

If an enclosure variant with forced ventilation is chosen, with a cable chamber bayed to the side of a modular enclosure, a vented roof plate must not be used, as this would prevent ventilation of the modular enclosure compartment.

A detailed configuration of the cable chambers can be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

VX25 Ri4Power

Distribution busbar section

The distribution busbar section is used for the vertical routing of busbars within a section, e.g. for supplying power to adjacent modular panels.

- With its extensive range of connection parts, the VX25 Ri4Power System supports the quick and easy connection of many different conductor materials
- A very narrow construction width of just 400 mm is supported
- The busbar positions of the main and distribution busbars are maintained

The distribution busbar section with a vertically routed busbar system should only be fitted with a distribution busbar system with an identical design to the main busbar system. Furthermore, this section type is only possible for low-voltage systems with a main busbar system in the roof section.

For dimensioning the distribution busbar section with a vertically routed busbar system, the following parameters must be known:

- Model and configuration of the main busbar system
- The required rated current I_{nc} for the vertical distribution busbar system under the selected conditions
- The protection category of the enclosure and type of cooling
- The required short-circuit resistance of the distribution busbar system

When designing the short-circuit withstand strength for the distribution busbar system, the standard states it is admissible to reduce the short-circuit withstand strength compared with the main busbar system, so that it is still greater than the on-state values of the protective devices connected downstream.

For the rated current I_{nc} of the distribution busbar system, the specified rated values should be applied for use as a main busbar system, with due regard for the enclosure protection category and cooling.

A detailed configuration can be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

VX25 Ri4Power

Riser section

The riser section is used to relocate the position of the main busbar system from the roof to the rear, and vice versa.

- Simple, fast assembly with functional bar supports
- The use of standard copper busbars helps to significantly reduce costs
- The full range of VX25 Ri4Power system accessories is also available

The following parameters must be known:

- Model and configuration of the main busbar system
- Enclosure protection category and type of cooling

Busbar risers from the modular VX25 Ri4Power system are comprised of VX25 enclosures with inner separation in a modular design and other required system accessories. With this section type, the main busbar system can link the busbar positions in the roof section or rear section together.

A detailed configuration can be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.

VX25 Ri4Power

Corner section

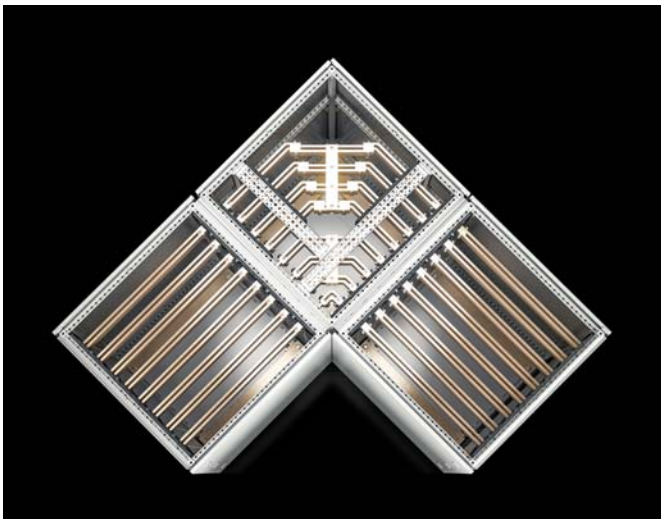
The corner section allows you to create a right-angled VX25 Ri4Power switchgear assembly.

- Ideal for maximising the existing switchgear installation space
- Consistent continuation of the system benefits associated with the VX25 Ri4Power system translates into significant time and material savings
- May be designed as an internal or external corner section

The corner section is designed for right-angled deflection of the main busbar system. The main busbar system may optionally be arranged in the central roof or rear section, depending on the system configuration.

A detailed configuration can be found in the valid VX25 Ri4Power assembly instructions.

Note:
The equipment manufacturer's specifications must be observed.



VX25 Ri4Power

Blank section

To accommodate reserves

The empty panel only contains the main busbar system for the central roof or rear section and is used for retro-fitting components.

- Supports enclosure width from 400 mm to 1200 mm
- The full range of VX25 Ri4Power system benefits are available to use

Rittal – The System.

Faster – better – everywhere.

ENCLOSURES | POWER DISTRIBUTION | CLIMATE CONTROL

FRIEDHELM LOH GROUP

VX25 Ri4Power 185 Compact – for more reliable power distribution

The VX25 Ri4Power 185 Compact busbar system for rated currents of up to 2100 A provides ideal requirements for the compact, secure assembly of power distributors with due regard for financial aspects and the requirements of standard IEC 61 439.

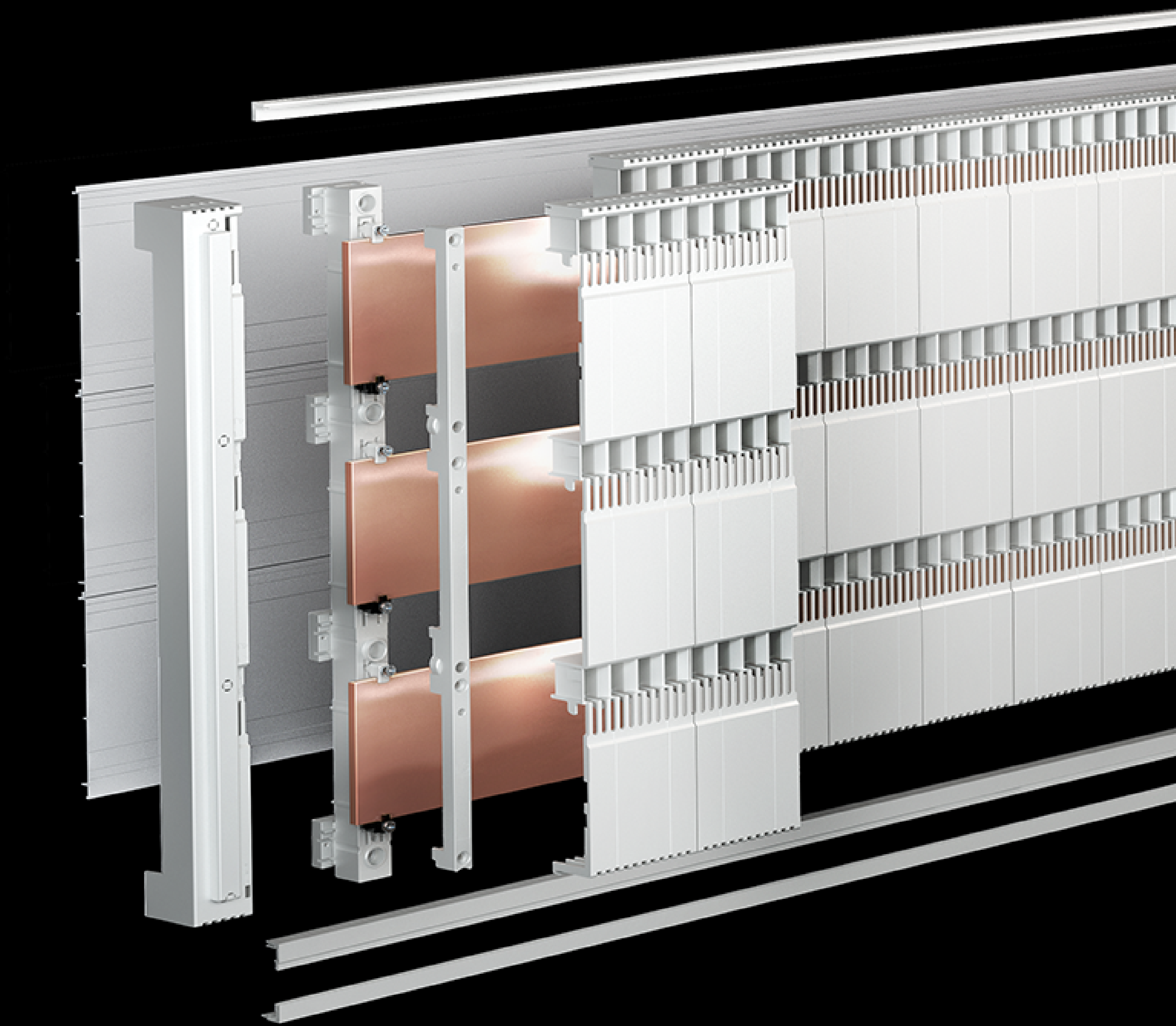
The system technology is based on 185 mm bar centre distance and facilitates fast, reliable installation using standardised components and simple assembly techniques. Many items are available in sets to suit any enclosure width, and include all the necessary components for configuring the system in the enclosure, including the contact hazard protection cover plate. The busbar support is positioned using the system attachments to avoid any loss of configuration space. The entire enclosure width is available to use. Other user-friendly features include no-drill assembly and simple adaptation to various bar cross-sections. Allowance is also made for the arrangement of the busbars, with full integration into the contact hazard protection system.

The VX25 Ri4Power 185 Compact busbar system is project planned using the Rittal Power Engineering configuration software, available as an online tool on the Rittal website. Once project planning is complete, an individual design verification is easily generated with this software.

System assembly – No drilling required

The busbar system is quickly and conveniently installed in the enclosure in just three steps:

- Position the system attachment in the enclosure
- Secure the busbar assembly
- Clip the cover system into place



Busbar support

- For busbar dimensions ranging from 40 x 10 to 120 x 10 mm
- The support may be top-mounted with components using the pitch pattern of the cover system
- Rated short-time withstand current I_{cw} up to 50 kA
- Rated busbar currents of up to 2100 A
- Mounting via system attachment in the VX25 baying enclosure system, no drilling required

Cover section

- Contact hazard protection up to IP2XB (safe from finger-contact)
- Integral busbar shielding to prevent accidental arcing
- Secure positioning of the top-mounting components, thanks to centring device
- New contact system allows components to be top-mounted on the cover section
- Components are easily retrofitted without removing the cover section

Base tray

- For rear contact hazard protection of the busbar assembly
- For optimum all-round contact hazard protection in conjunction with the cover section
- Prepared ready to install, fits VX25 baying enclosure system widths from 600 mm to 1200 mm

The perfect-fit adaptor system

Connection and component adaptors for tested, safe connection at high currents

- For air circuit-breakers up to 630 A and 1600 A
- Direct connection of various conductor types
- No-drill connection system to the busbar

Busbar connection adaptors and connection blocks

- Compact, fast connection of cables and lines
- Suitable for various types of conductor
- With standardised contact hazard protection cover plates

Component adaptors for compact circuit-breakers

- Two sizes up to 630 A and 1600 A
- Variants for clamping or screw attachment
- Make contact without drilling
- Ideal for incoming and outgoing circuits

Connector kit and transformer

- Form-fit, prepared for switch brands ABB, Eaton, Schneider Electric, Siemens
- Preassembled connector kits from the adaptor to the circuit-breaker
- Optional integration of a current transformer
- Complete contact hazard protection in the inlet and outlet zones

Disconnect and switch with one device

The NH slimline switch-disconnectors for operator-independent disconnection and switching with fuses

- Integral quick-break contact with double-break ensures safe operation
- User-friendly cable connection from above or below
- May be combined with component adaptors and NH slimline fuse-switch disconnectors

NH slimline switch-disconnectors

- Suitable for fuse sizes 00 to 3
- No-drill contacting with clamping screw attachment
- Optionally with electronic fuse monitoring

Operator-independent switch element

- Fast switching operation with quick-break contact
- Double-break allows fuse replacement with the system de-energised
- Lid lock can only be released with a tool
- Integral switch position display

Cable connection space

- User-friendly cable connection optionally from above or below
- Connection of various conductor types
- Extended contact hazard protection for the connection space

Fuse elements to suit all situations

The system of NH slimline fuse-switch disconnectors is based on separate air routing for heat dissipation, and targeted removal of switching gases.

- Simple device assembly
- Single-pole or 3-pole, switchable
- Optimum contact hazard protection

NH slimline fuse-switch disconnectors, sizes 00 to 3

- Single-pole and 3-pole switchable variants
- Symmetrical layout for cable outlet at the top and bottom
- Optional integration of current transformers
- Versions with and without fuse monitoring
- Self-closing voltage testing holes
- Prepared for multiple lead seals
- Hinged terminal cover
- Cascadable connection space extension
- Simple conversion of the bolt or screw connections
- Contact hazard-proof fuse contacts with the top section dismantled
- Optional micro-switch monitoring of the cover switch position

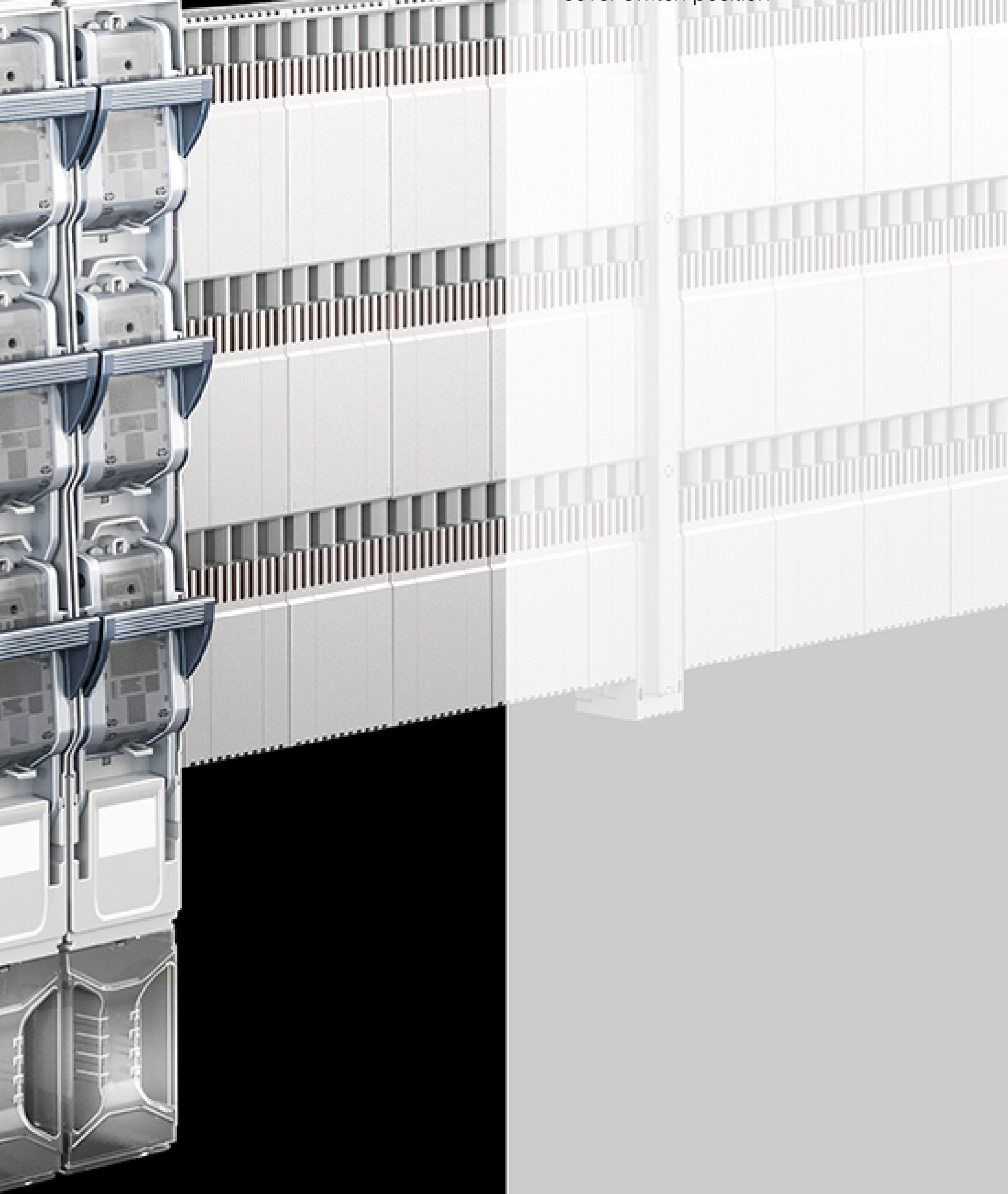



ABB
EATON
SIEMENS
Schneider

VX25 Ri4Power 185 Compact

The admissible rated operating current I_{nc} of the devices installed on the VX25 Ri4Power 185 Compact busbar system depends on the type of protection of the switchgear and the number of devices.

Details can be taken from the following table.

Table 11: Data table of the rated values for currents

Model No.	Designation	Type	Devices I_n		IP2X vent.[1)]	IP2X	IP54 vent.[1)]	IP54	Heat loss at I_n
SV 9677.500	Busbar support[2)]	40 x 10	–	I_{cw} 50 kA	1100	980	1100	920	–
SV 9677.500	Busbar support[2)]	60 x 10	–	I_{cw} 50 kA	1390	1220	1390	1130	–
SV 9677.500	Busbar support[2)]	80 x 10	–	I_{cw} 50 kA	1660	1420	1660	1320	–
SV 9677.500	Busbar support[2)]	100 x 10	–	I_{cw} 50 kA	1930	1570	1930	1490	–
SV 9677.500	Busbar support[2)]	120 x 10	–	I_{cw} 50 kA	2180	1680	2180	1600	–
SV 9677.770	Adaptor ABB[2)]	XT5L	630	I_{cc} 100 kA	630	530	630	490	–
SV 9677.710	Adaptor ABB[2)]	XT7	1600	I_{cc} 100 kA	1440	1200	1440	1100	231
SV 9677.770	Adaptor Eaton[2)]	NZM3	630	I_{cc} 100 kA	630	580	630	550	–
SV 9677.710	Adaptor Eaton[2)]	NZM4	1600	I_{cc} 50 kA	1540	1370	1540	1220	291
SV 9677.770	Adaptor Schneider Electric[2)]	NSX630	630	I_{cc} 100 kA	630	580	630	550	–
SV 9677.700	Adaptor Schneider Electric[2)]	NS1000	1000	I_{cc} 100 kA	1000	1000	1000	990	–
SV 9677.710	Adaptor Schneider Electric[2)]	NS1600	1600	I_{cc} 100 kA	1390	1240	1390	1075	222
SV 9677.770	Adaptor Siemens[2)]	3VA2463	630	I_{cc} 100 kA	630	550	630	525	–
SV 9677.710	Adaptor Siemens[2)]	3VA2716	1600	I_{cc} 100 kA	1460	1100	1460	980	–
SV 9677.000/.010	Fuse-switch disconnector, single[3)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	28
SV 9677.100/.110	Fuse-switch disconnector, single[3)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	24
SV 9677.200/.210	Fuse-switch disconnector, single[3)]	NH 2	400	I_{cc} 100 kA	400	375	400	335	60
SV 9677.300/.310	Fuse-switch disconnector, single[3)]	NH 3	630	I_{cc} 100 kA	630	555	630	490	118
SV 9677.000/.010	Fuse-switch disconnector, group[2)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	28
SV 9677.100/.110	Fuse-switch disconnector, group[2)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	24
SV 9677.200/.210	Fuse-switch disconnector, group[2)]	NH 2	400	I_{cc} 100 kA	400	360	400	310	60
SV 9677.300/.310	Fuse-switch disconnector, group[2)]	NH 3	630	I_{cc} 100 kA	630	470	630	420	118
SV 9677.06X/.07X	Slimline switch-disconnector, single[3)]	NH 00	160	I_{cc} 100 kA	160	160	160	160	55
SV 9677.16X	Slimline switch-disconnector, single[3)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	80
SV 9677.26X	Slimline switch-disconnector, single[3)]	NH 2	400	I_{cc} 100 kA	400	400	400	385	220
SV 9677.36X	Slimline switch-disconnector, single[3)]	NH 3	630	I_{cc} 100 kA	630	580	630	550	250
SV 9677.06X/.07X	Slimline switch-disconnector, group[2)]	NH 00	160	I_{cc} 100 kA	160	160	160	130	55
SV 9677.16X	Slimline switch-disconnector, group[2)]	NH 1	250	I_{cc} 100 kA	250	250	250	250	80
SV 9677.26X	Slimline switch-disconnector, group[2)]	NH 2	400	I_{cc} 100 kA	400	365	400	315	220
SV 9677.36X	Slimline switch-disconnector, group[2)]	NH 3	630	I_{cc} 100 kA	630	510	630	380	250
SV 9677.900	Connection adaptor[2)]	800	800	I_{peak} 52 kA	800	770	800	710	270
SV 9677.905	Connection adaptor[2)]	1400	1400	I_{peak} 107 kA I_{cw} 40 kA	1400	1130	1400	1070	550
SV 9677.910	Connection block [2)]	1600	1600	I_{peak} 109 kA I_{cw} 51 kA	1600	1600	1600	1520	–
SV 9677.915	Connection block [2)]	1000	1000	I_{peak} 107 kA I_{cw} 50 kA	1000	1000	1000	1000	–
SV 9677.920	Connection block [2)]	1600	1600	I_{peak} 107 kA I_{cw} 50 kA	1600	1500	1600	1350	–

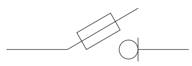
1) A fan-and-filter unit SK 3244.100 must be used to achieve the values (1 per door).
2) Rated operating current of a main circuit I_{ng}
3) Rated current of an outgoing main circuit I_{nc}

VX25 Ri4Power 185 Compact

Table 12: NH slimline fuse-switch disconnectors, size 00 to 3 (185 mm)

Model No.		**9677.000 9677.025**	**9677.010**	**9677.100**	**9677.110**	**9677.200 9677.210**	**9677.300**	**9677.310**	**9677.340**
Size (NH fuse inserts to IEC/EN 60 269-2)		00	00	1	1	2	3	3	3
Rated operating current I_e		160 A	160 A	250 A	250 A	400 A	630 A	630 A	1250 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV	8 kV
Contamination level		3	3	3	3	3	3	3	3
Overvoltage category at 1000 V		III	III	III	III	III	III	III	III
Overvoltage category at 690 V		IV	IV	IV	IV	IV	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	100 kA	100 kA	120 kA	120 kA	120 kA	100 kA	100 kA	100 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA	100 kA	80 kA	80 kA	80 kA
	at 800 V AC	30 kA[1)]	–	50 kA[3)]	–	–	50 kA[4)]	–	–
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-23B	AC-20B
	500 V AC	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-22B	AC-20B
	690 V AC	AC-21B[2)]	AC-21B[2)]	AC-22B	AC-22B	AC-22B	AC-21B[5)]	AC-21B[5)]	AC-20B
	800 V AC	AC-22B[1)]	–	AC-22[3)]	–	AC-20B	AC-22B[4)]	–	DC-20B
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	DC-20B	–
Mechanical life (switching cycles)		1400	1400	1400	1400	800	800	800	800
Contact hazard protection – operating area max.		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60 947-1, section 6 and pollution degree 3							
Admissible ambient temperature for shipping and storage		-25 °C…+55 °C							
PV max/fuse insert		12 W	12 W	23 W	23 W	34 W	48 W	48 W	48 W

1) Size 00 (63 A, gG)
2) Size 00 (125 A, gG)
3) Size 1 (160 A, gG)
4) Size 3 (315 A, gG)
5) Size 3 (500 A, gG)

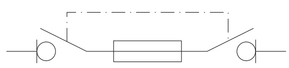


Fuse-switch
Single break

Table 13: NH slimline switch-disconnectors, size 00 to 3 (185 mm)

Model No.		**9677.060 9677.070**	**9677.160**	**9677.260 9677.265**	**9677.360**
Size (NH fuse inserts to IEC/EN 60 269-2)		00	1	2	3
Rated operating current I_e		160 A	250 A	400 A	630 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	12 kV	12 kV	12 kV
Contamination level		3	3	3	3
Overvoltage category at 1000 V		IV	IV	IV	IV
Overvoltage category at 690 V		III	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	120 kA	120 kA	120 kA	120 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA
	at 800 V AC	30 kA[1)]	50 kA[2)]	–	50 kA[3)]
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	500 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	690 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	800 V AC	AC-22B[1)]	AC-22B[2)]	–	AC-22B[3)]
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B[4)]
Mechanical life (switching cycles)		1400	1400	800	800
Contact hazard protection – operating area max.		IP30	IP30	IP30	IP30
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60 947-1, section 6 and pollution degree 3			
Admissible ambient temperature for shipping and storage		-25 °C…+55 °C			
PV max/fuse insert		12 W	32 W	45 W	48 W

1) Size 00 (63 A, gG)
2) Size 1 (160 A, gG)
3) Size 3 (315 A, gG)
4) Size 3 (500 A, gG)



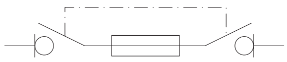
Fuse-switch
Double break

VX25 Ri4Power 185 Compact

Table 14: NH slimline switch-disconnectors, size 00 to 3 (185 mm)

Model No.		**9677.065 9677.075**	**9677.165**	**9677.265**	**9677.365**
Size (NH fuse inserts to IEC/EN 60 269-2)		00	1	2	3
Rated operating current I_e		160 A	250 A	400 A	500 A
Rated operating voltage U_e		690 V AC	690 V AC	690 V AC	690 V AC
Rated insulation voltage U_i		1000 V	1000 V	1000 V	1000 V
Rated impulse withstand voltage U_{imp}		8 kV	12 kV	12 kV	12 kV
Contamination level		3	3	3	3
Overvoltage category at 1000 V		IV	IV	IV	IV
Overvoltage category at 690 V		III	IV	IV	IV
Rated frequency		50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Conditional rated short-circuit current (when protected with fuse inserts)	at 500 V AC	120 kA	120 kA	120 kA	120 kA
	at 690 V AC	100 kA	100 kA	100 kA	100 kA
	at 800 V AC	30 kA[1)]	50 kA[2)]	–	50 kA[3)]
Utilisation category	400 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	500 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	690 V AC	AC-23B	AC-23B	AC-23B	AC-23B
	800 V AC	AC-22B[1)]	AC-22B[2)]	–	AC-22B[3)]
	1000 V DC	DC-20B	DC-20B	DC-20B	DC-20B[4)]
Mechanical life (switching cycles)		1400	1400	800	800
Contact hazard protection – operating area max.		IP30	IP30	IP30	IP30
Siting conditions		Indoor siting: Humidity 50% at 40°C or 90% at 20°C (without condensation due to temperature fluctuations) to IEC/EN 60947-1, section 6 and pollution degree 3			
Admissible ambient temperature for shipping and storage		-25 °C...+55 °C			
PV max/fuse insert		12 W	32 W	45 W	48 W

1) Size 00 (63 A, gG)
2) Size 1 (160 A, gG)
3) Size 3 (315 A, gG)
4) Size 3 (500 A, gG)



Fuse-switch
Double break

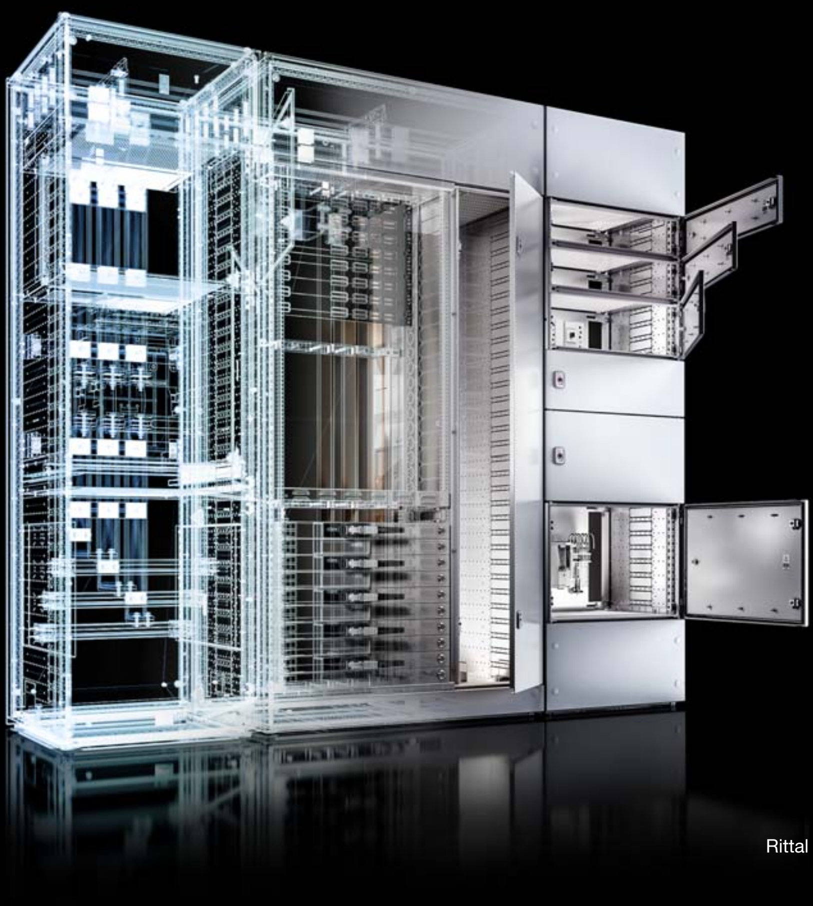
VX25 POWER ENGINEERING

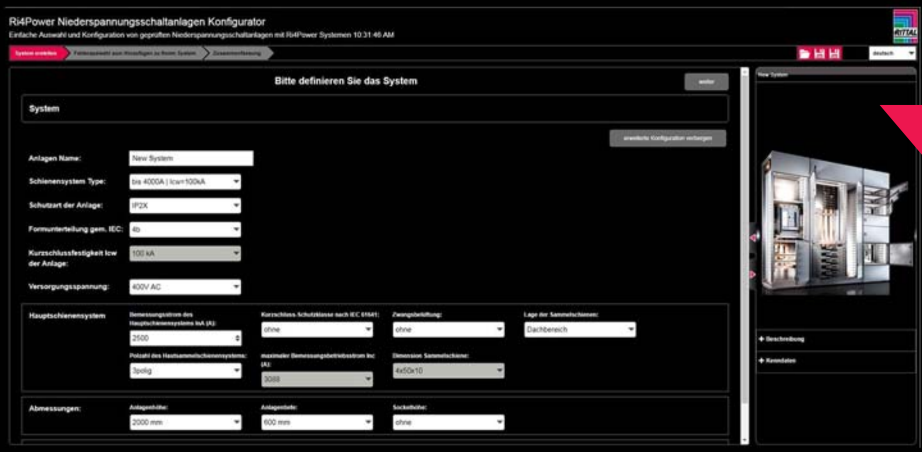
The ultimate in user-friendly planning

Our Power Engineering planning tool heralds a new era. Just like the underlying VX25, our VX25 Power Engineering planning software sets new standards when planning low-voltage switchgear. The Web-based tool guides users quickly and efficiently through the entire planning process in simple, logical steps.
The free online tool can be found on the Rittal website at www.rittal.de/planungssoftware

The benefits to you:

- The web-based application ensures that planning data is always up-to-date
- System configuration in either a simplified or detailed version
- Parts list and assembly based on a specific set of rules
- Automatic calculation and documentation of the copper busbars
- Generation of a design verification to IEC 61 439
- System documentation including assembly instructions
- Order immediately via a direct link to the online webshop
- Technical service support, including free assistance with project planning and quote preparation
- All planning data stored locally on your computer



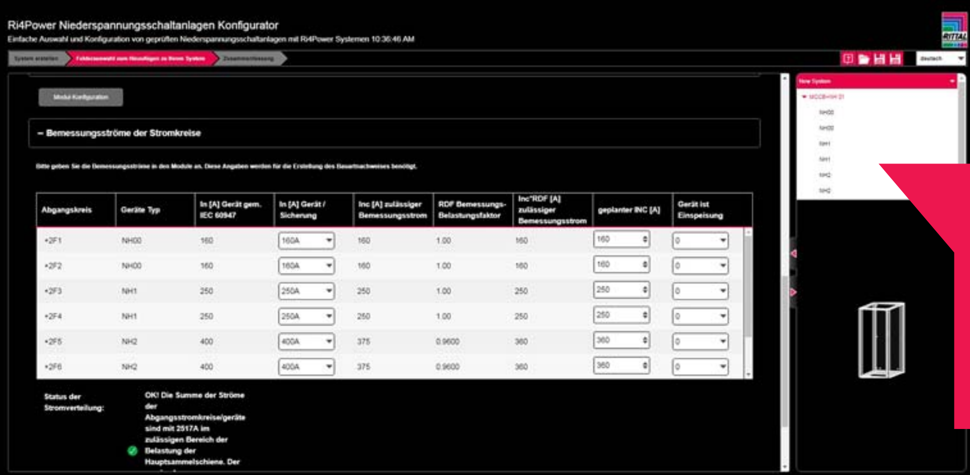


System definition

- Define system parameters to IEC 61 439
- Configure the main busbar system
- Input the key dimensions and planned PE system

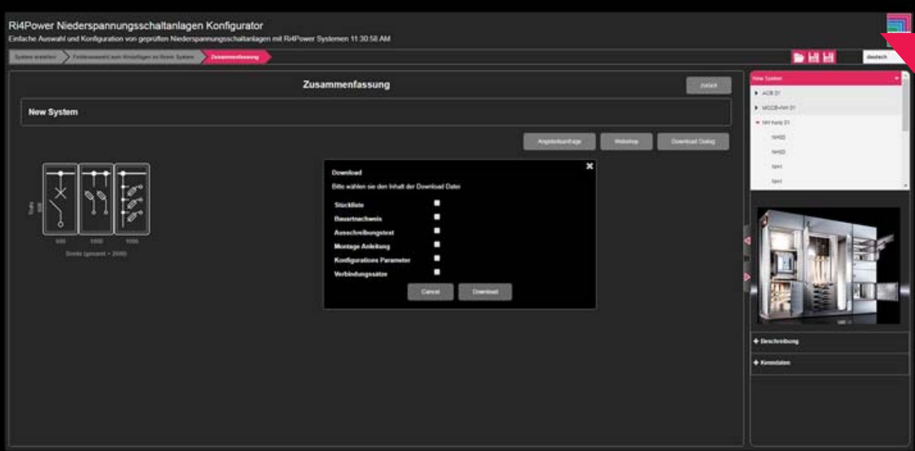
Section selection and configuration

- Compile tested sections into a complete switchgear
- Select certified components from brand-name manufacturers and Rittal power distribution products
- Individually configure sections with selected modules



Circuit calculation

- Determine device-specific properties
- Calculate admissible rated currents I_{nc} (A)
- Calculate the specific rated diversity factor (RDF)



Output

- Automated generation of system documentation including design verification to IEC 61 439
- Documentation of copper bars including free drawings
- Order directly via the webshop link

VX25 Power Engineering

Explanation of the design code

The VX25 Power Engineering planning tool generates an individual design code for the planned switchgear.
The code defines the design of the following connections:
- Connection of the switches to the infeed and main busbar system (Model No. 9686.912)
- Connection of the distribution busbar system to the main busbar system (Model No. 9686.924)

The Model Number and design code are then combined to form the version code for the relevant connection.

Example of a switch connection:

Model number	9686.912
Design code	A8068A0S3A3VV661N41111
Version code	9686.912 + A8068A0S3A3VV661N41111

Meaning of the design code

The design code for the switch connection (SV 9686.912) is comprised of 22 digits with the following meaning and selection options:

Meaning	Code	Value			A8068A0S3A3VV661N41111			
Section type					A	ACB section – Roof section		
	A	ACB section – Roof section						
	W	ACB section – Rear section						
	C	MCCB section – Roof section						
	D	MCCB section – Rear section						
	G	Generator section						
	H	Coupling section – Roof section						
	I	Coupling section – Rear section						
Section width					8	800		
	4	400						
	6	600						
	8	800						
	0	1000						
	2	1200						
Section height					0	2000		
	0	2000						
	2	2200						
Section depth					6	600		
	6	600						
	8	800						

VX25 Power Engineering

Explanation of the design code

Meaning	Code	Value			A8068A0S3A3VV661N41111			
Busbar location, bottom					8	Cable connection		
	0	None						
	1	Roof section						
	3	Rear centre section, 185 Compact						
	5	Rear centre section, 185						
	6	Base section:						
	8	Cable connection						
	9	Directly beneath the switch						
Busbar system, bottom					A	Maxi-PLS 45 S	1600 A	3-pole
	A	Maxi-PLS 45 S	1600 A	3-pole				
	B	Maxi-PLS 45 S	1600 A	4-pole				
	C	Maxi-PLS 45	2000 A	3-pole				
	D	Maxi-PLS 45	2000 A	4-pole				
	E	Maxi-PLS 60	3200 A	3-pole				
	F	Maxi-PLS 60	3200 A	4-pole				
	G	30 x 05		3-pole				
	H	30 x 05		4-pole				
	I	30 x 10		3-pole				
	J	30 x 10		4-pole				
	K	40 x 10		3-pole				
	L	40 x 10		4-pole				
	M	50 x 10		3-pole				
	N	50 x 10		4-pole				
	O	60 x 10		3-pole				
	P	60 x 10		4-pole				
	Q	80 x 10		3-pole				
	R	80 x 10		4-pole				
	S	100 x 10		3-pole				
	T	100 x 10		4-pole				
	U	120 x 10		3-pole				
	V	120 x 10		4-pole				
	W	160 x 10		3-pole				
	X	160 x 10		4-pole				
	Z	Other or no busbar system						
No. of supports and bars at the bottom					0	None		
	0	None						
	2	One support with 2 bars						
	4	One support with 4 bars						
	9	Two supports with 4 bars						
Switch make					S	Siemens		
	A	ABB						
	J	Mitsubishi						
	M	Schneider						
	S	Siemens						
	T	Terasaki						
	E	Eaton						
	G	GE						
	L	LS ELECTRIC						

VX25 Power Engineering

Explanation of the design code

Meaning	Code	Value			A8068A0S3A3VV661N41111			
Switch size (according to manufacturer information)					3	BG3		
	0	BG0						
	1	BG1/none						
	2	BG2						
	3	BG3						
	4	BG4						
	7	BG1						
	8	BG2						
Switch rated current I_n					A	630 A		
	A	630 A						
	B	800 A						
	C	1000 A						
	D	1250 A						
	E	1600 A						
	F	2000 A						
	G	2500 A						
	H	3200 A						
	I	4000 A						
	J	5000 A						
	K	6300 A						
Switch version					3	Fixed 3-pole		
	3	Static				3-pole		
	4	Static				4-pole		
	5	Fixed with N				3-pole		
	6	Slide-in				3-pole		
	8	Slide-in				4-pole		
	9	Slide-in, with N				3-pole		
Switch connection contacts					V	Vertical		
	H	Horizontal						
	V	Vertical						
Switch installation					V	In front of door		
	V	In front of door						
	H	Behind door						
Compartment height below switch					6	600		
	0	0						
	1	150						
	2	200						
	3	300						
	4	400						
	5	500						
	6	600						
	8	800						
	9	1000						
Compartment height for switch					6	600		
	6	600						
	8	800						
	0	1000						

VX25 Power Engineering

Explanation of the design code

Meaning	Code	Value			A8068A0S3A3VV661N41111			
Busbar location, top					1	Roof section		
	0	Without busbar						
	1	Roof section						
	3	Rear centre section, 185 Compact						
	5	Rear centre section, 185						
	8	Cable connection						
	9	Directly beneath the switch						
Busbar system, top					N	50 x 10	0	4-pole
	A	Maxi-PLS 45 S	1600 A	3-pole				
	B	Maxi-PLS 45 S	1600 A	4-pole				
	C	Maxi-PLS 45	2000 A	3-pole				
	D	Maxi-PLS 45	2000 A	4-pole				
	E	Maxi-PLS 60	3200 A	3-pole				
	F	Maxi-PLS 60	3200 A	4-pole				
	G	30 x 05		3-pole				
	H	30 x 05		4-pole				
	I	30 x 10		3-pole				
	J	30 x 10		4-pole				
	K	40 x 10		3-pole				
	L	40 x 10		4-pole				
	M	50 x 10		3-pole				
	N	50 x 10		4-pole				
	O	60 x 10		3-pole				
	P	60 x 10		4-pole				
	Q	80 x 10		3-pole				
	R	80 x 10		4-pole				
	S	100 x 10		3-pole				
	T	100 x 10		4-pole				
	U	120 x 10		3-pole				
	V	120 x 10		4-pole				
	W	160 x 10		3-pole				
	X	160 x 10		4-pole				
	Z	Other or no busbar system						
No. of supports and bars at the top					4	One support with 4 bars		
	0	None						
	2	One support with 2 bars						
	4	One support with 4 bars						
	9	Two supports with 4 bars						
Supply includes connection bracket, top					1	yes		
	0	no						
	1	yes						
Supply includes connector kit, top					1	yes		
	0	no						
	1	yes						
Supply includes connector kit, bottom					1	yes		
	0	no						
	1	yes						
Supply includes connection bracket, bottom					1	yes		
	0	no						
	1	yes						

VX25 Power Engineering

Explanation of the design code

The design code for the distribution busbar connection (SV 9686.924) is comprised of 15 digits with the following meaning and selection options:

Meaning	Code	Value			M8264I6J411HM4Q			
Section type					M	Module section		
	M	Module section						
	N	NH section ABB JM						
	O	Riser section						
	P	Distribution busbar section						
	Q	Corner section (inside)						
	R	Design 2						
	S	External connection HSS roof						
	T	Corner section inner angle 90°						
	U	Corner section outer angle 270°						
Section width					8	800 wide		
	4	400						
	6	600						
	8	800						
	0	1000						
	2	1200						
Section height					2	2200 high		
	0	2000						
	2	2200						
Section depth					6	600 wide		
	6	600						
	8	800						
Busbar location, HSS					1	Roof section		
	1	Roof section						
	5	Rear centre section						
	6	Base section						
Busbar system, HSS					I	30 x 10		3-pole
	I	30 x 10		3-pole				
	J	30 x 10		4-pole				
	M	50 x 10		3-pole				
	N	50 x 10		4-pole				
	Z	Other						
Busbar strands HSS					6	6 busbar strands		
	1	1						
	2	2						
	3	3						
	4	4						
	5	5						
	6	6						
	7	7						
	8	8						

VX25 Power Engineering

Explanation of the design code

Meaning	Code	Value			M8264I6J411HM4Q			
Busbar system, VSS					J	30 x 10		4-pole
	A	PLS 1600		3-pole				
	B	PLS 1600		4-pole				
	G	30 x 05		3-pole				
	H	30 x 05		4-pole				
	I	30 x 10		3-pole				
	J	30 x 10		4-pole				
	M	50 x 10		3-pole				
	N	50 x 10		4-pole				
	O	60 x 10		3-pole				
	P	60 x 10		4-pole				
	Q	80 x 10		3-pole				
	R	80 x 10		4-pole				
	S	100 x 10		3-pole				
	T	100 x 10		4-pole				
	Z	Other or no busbar system						
Busbar strands VSS					4	4 busbar strands		
	0	0						
	1	1						
	2	2						
	4	4						
Busbar location incoming left					1	Roof section		
	1	Roof section						
	5	Rear centre section						
	A	Trim panels, top 100 mm, bottom 100 mm						
	B	Trim panels, top 100 mm, bottom 300 mm						
	C	Trim panels, top 300 mm, bottom 100 mm						
	D	Trim panels, top 300 mm, bottom 300 mm						
Busbar location outgoing right					1	Roof section		
	1	Roof section						
	5	Rear centre section						
External connection					H	2 x 60 x 10 Z; 1600 A		4-pole
	Z	Without busbar system						
	A	30 x 10 Z	630 A	3-pole				
	B	30 x 10 Z	630 A	4-pole				
	C	50 x 10 Z	1000 A	3-pole				
	D	50 x 10 Z	1000 A	4-pole				
	E	60 x 10 Z	1250 A	3-pole				
	F	60 x 10 Z	1250 A	4-pole				
	G	2 x 60 x 10 Z	1600 A	3-pole				
	H	2 x 60 x 10 Z	1600 A	4-pole				
	X	NH slimline fuse-switch disconnectors ABB						
	Y	NH slimline fuse-switch disconnectors Jean Müller						
	1	In front of the mounting plate – compartment divider depth 400 mm						
	2	In front of the mounting plate – compartment divider depth 600 mm						
	4	Behind the mounting plate – compartment divider depth 400 mm						
	5	Behind the mounting plate – compartment divider depth 600 mm						

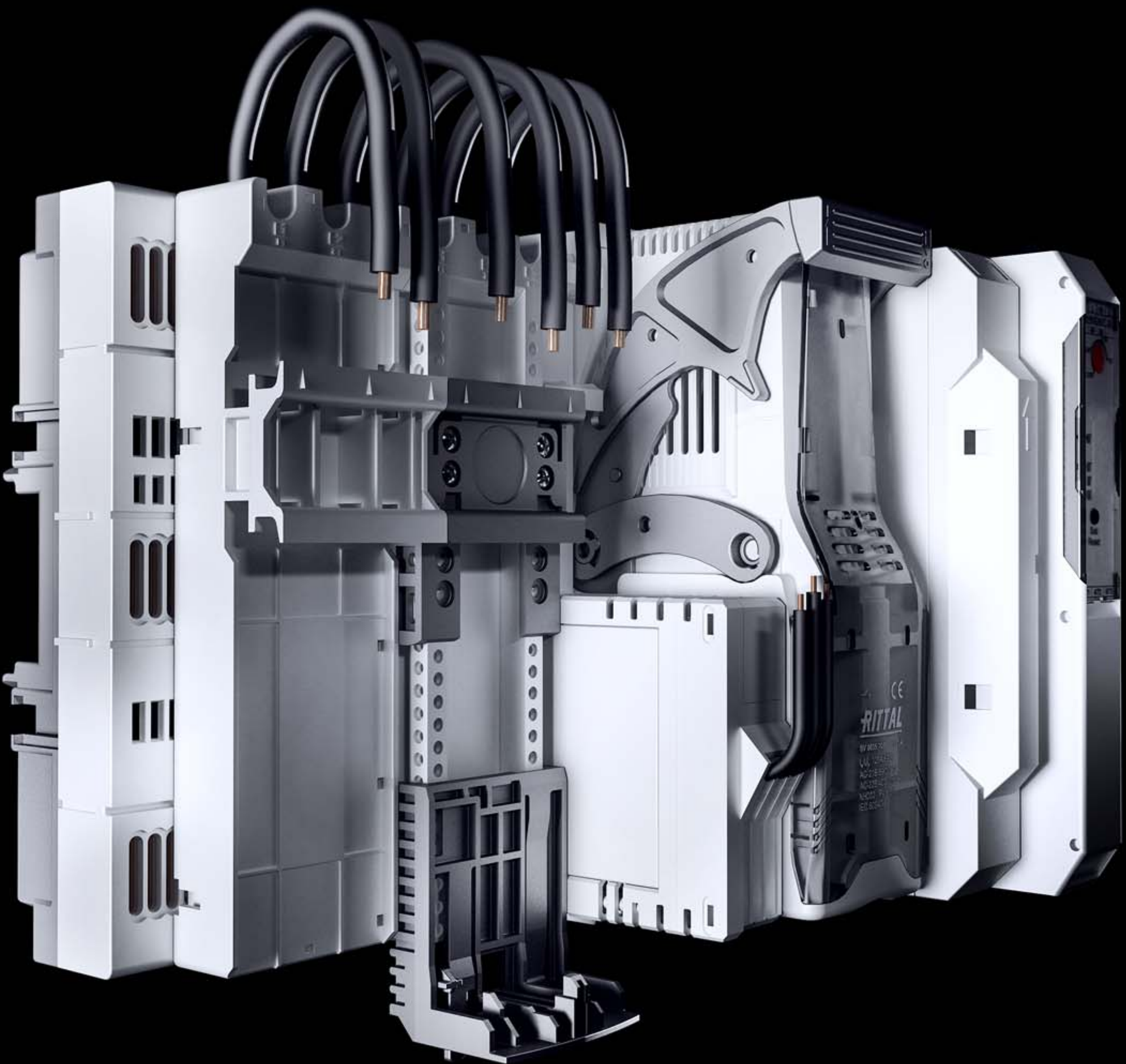
VX25 Power Engineering

Explanation of the design code

Meaning	Code	Value			M8264I6J411HM4Q			
N/ PEN busbar dimensions					M	50 x 10		
	M	50 x 10						
	Z	Other or no busbar system						
No. n strands bars					4	4 busbar strands		
	0	0						
	1	1						
	2	2						
	3	3						
	4	4						
PE dimension					Q	80 x 10		
	Z	Other or no busbar system						
	G	30 x 5						
	I	30 x 10						
	K	40 x 10						
	Q	80 x 10						

RiLine Compact

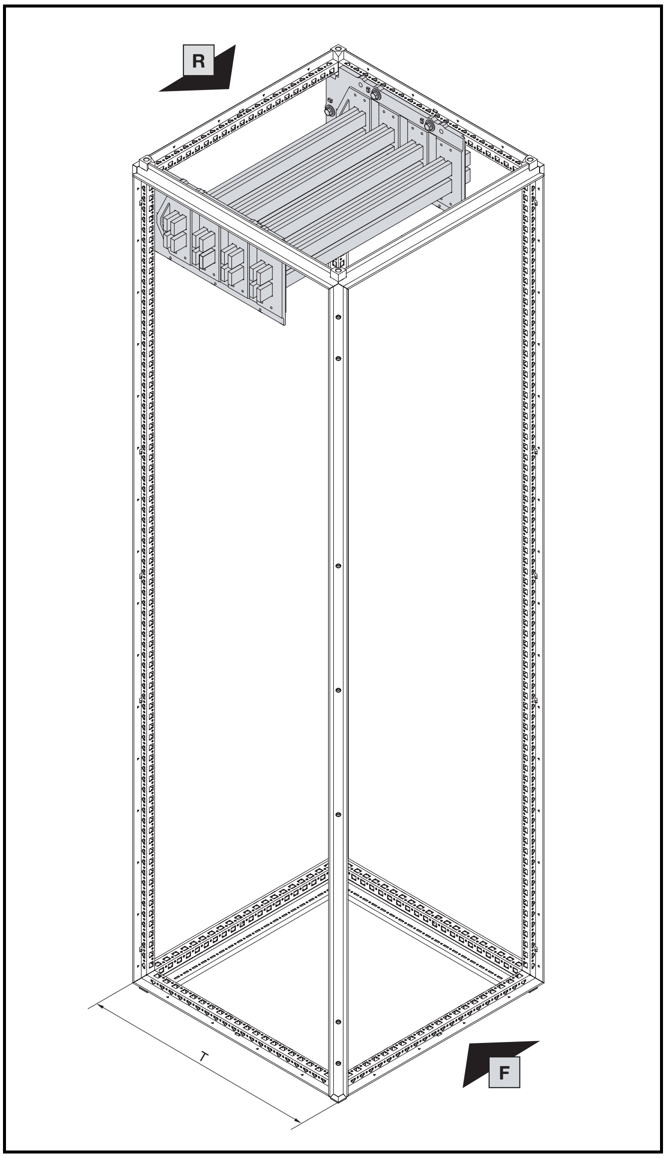
The smart power distribution system

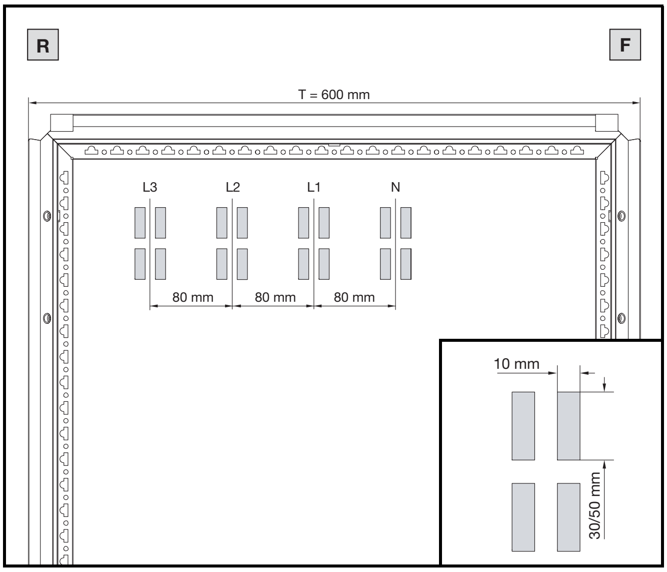


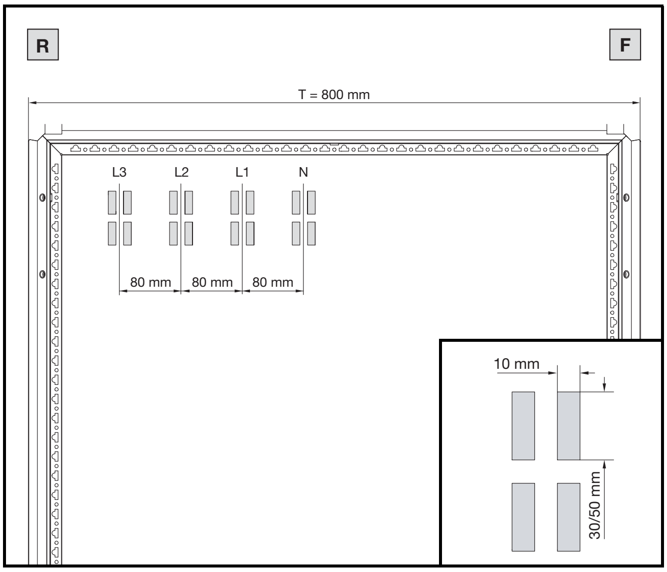
System overview of the main busbar

Busbar routing in roof section, up to 4000 A

Configuration variants







T = D

Busbar dimensions mm	Baying	**Model No.**
30 x 10	■	**9686.000**
30 x 10	–	**9686.010**
50 x 10	■	**9686.030**
50 x 10	–	**9686.040**

front view

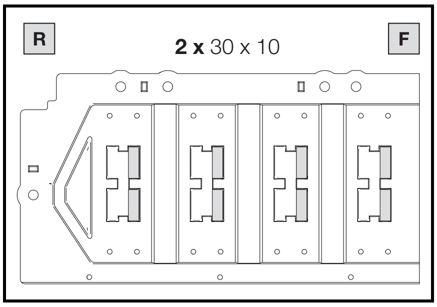
rear view

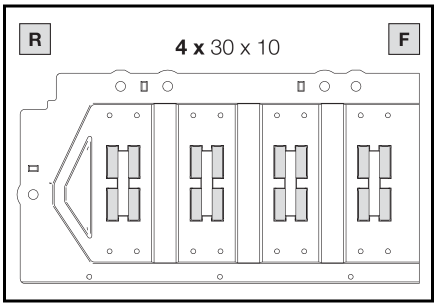
VX25 Ri4Power

System overview of the main busbar

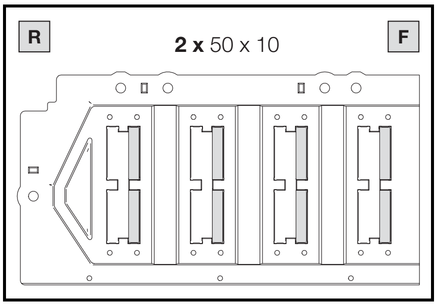
Busbar routing in roof section, up to 4000 A

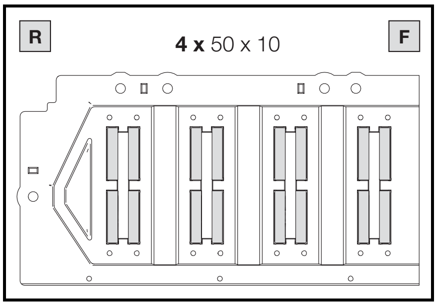
Population of busbar support 30 x 10



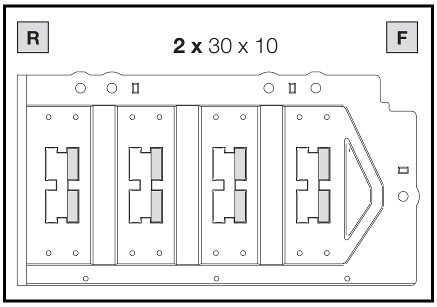


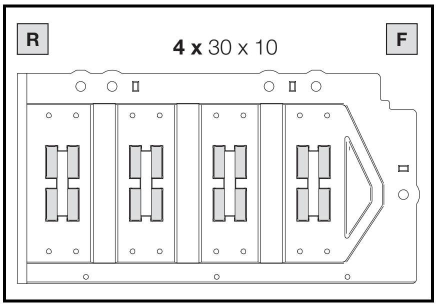
Population of busbar support 50 x 10



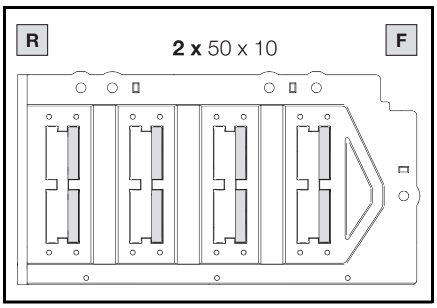


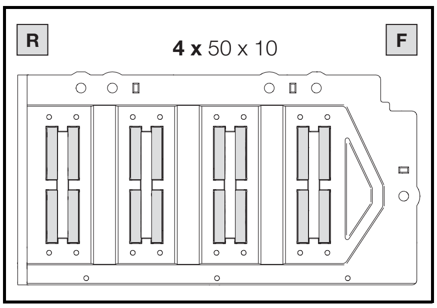
Population of busbar support 30 x 10 with mounting plate





Population of busbar support 50 x 10 with mounting plate

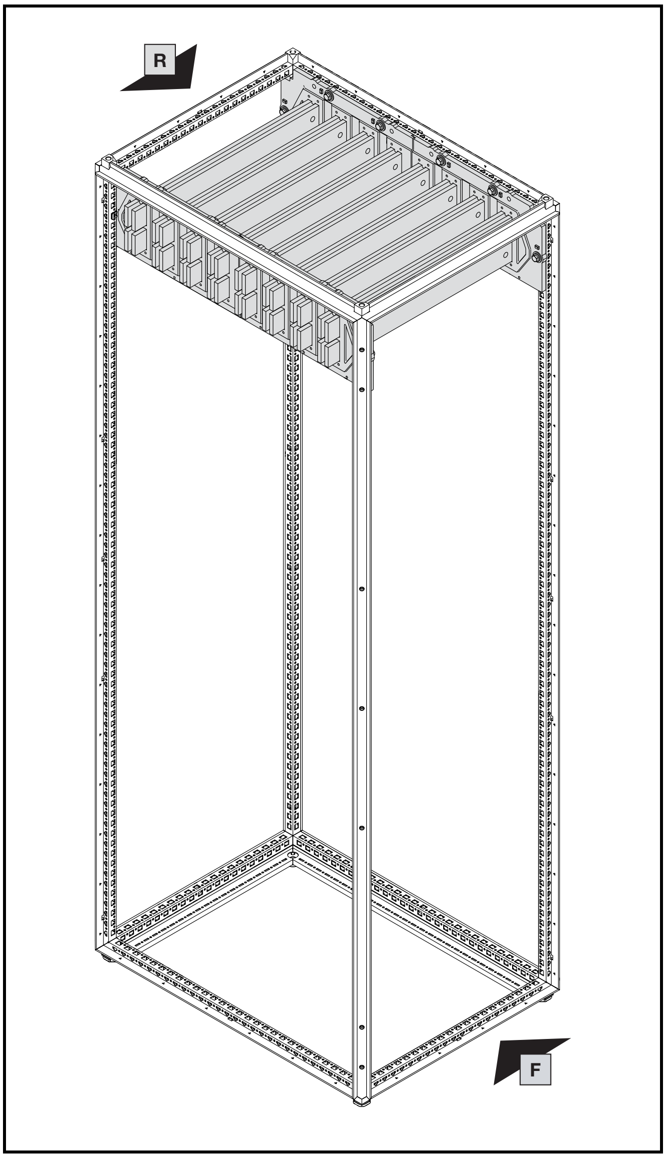


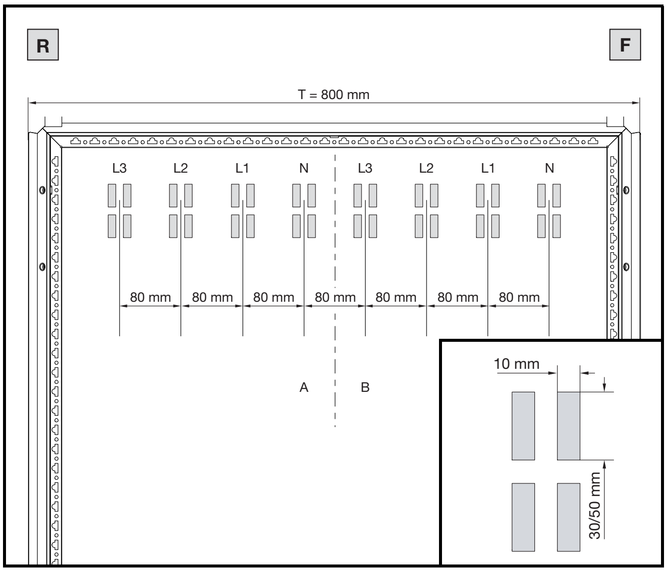


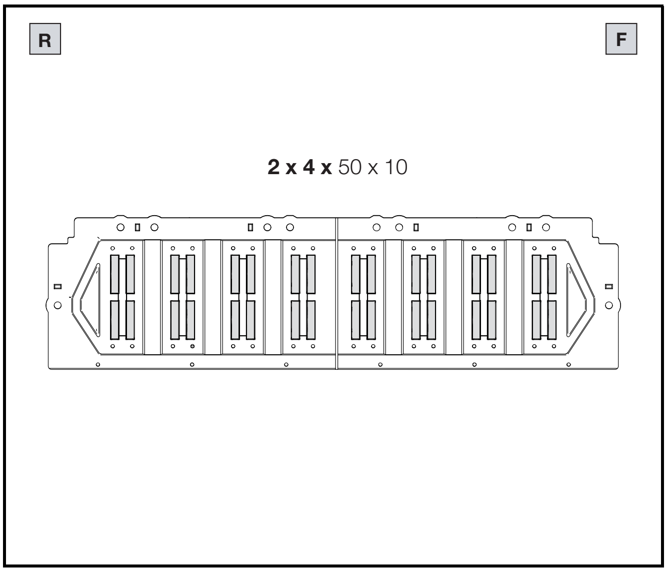
System overview of the main busbar

Busbar routing in roof section, up to 6300 A

Configuration







T = D

Busbar dimensions mm	Baying	**Model No.**
50 x 10	■	**9686.030**
50 x 10	–	**9686.040**

front view

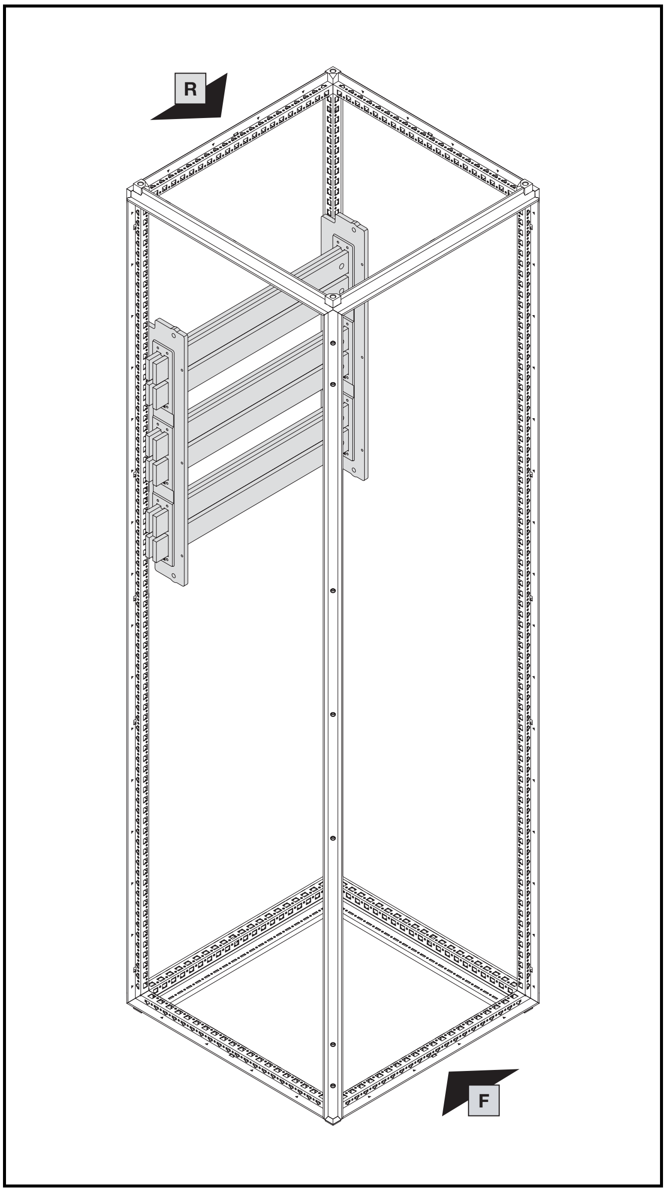
rear view

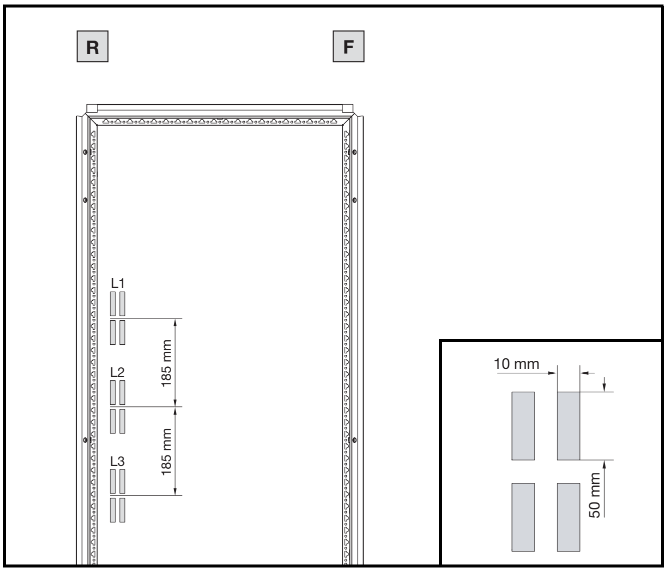
VX25 Ri4Power

System overview of the main busbar

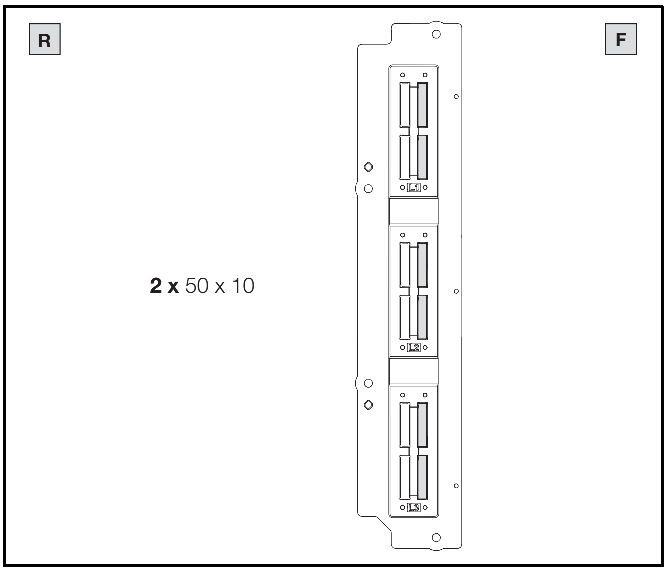
Busbar routing in the rear centre section

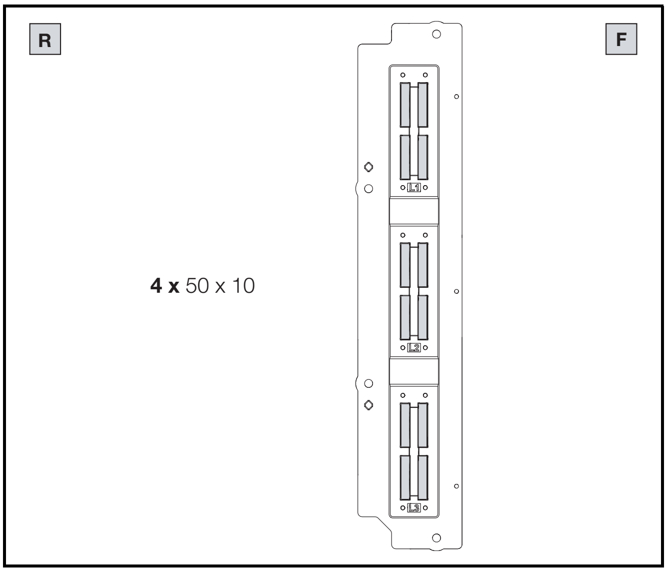
Configuration variants





Population of busbar support 50 x 10, rear section





Busbar dimensions mm	Baying	**Model No.**
50 x 10	■	**9686.060**
50 x 10	–	**9686.070**

front view

rear view

VX25 Ri4Power

System overview of the main busbar

Busbar rated currents

The admissible rated operating currents I_{nc} of the usable busbar systems have been tested with the following values, with due regard for the enclosure, the installation situation inside the enclosure, the protection category and cooling. Based on the extended test conditions compared with the test conditions in DIN 43 671 (busbars laid in free air), this produces rated values that deviate from standard DIN 43 671.

Table 15: I_{nc} of main busbar up to 4000 A (roof section)[1)]

Busbar	IP54			IP2X			IP54 vent./ IP2X vent.			I_{pk}/I_{cw}
	30 K	70 K	95 K	30 K	70 K	95 K	30 K	70 K	85 K	
	[A]			[A]			[A]			
4 x 50 x 10	1525	2410	2860	1625	2585	3010	2350	3520	3840[3)]	220/100 kA[1)]
2 x 50 x 10	1160	1780	2040	1200	1800	2250	1660	2500	2700	143/65 kA[1)]
4 x 30 x 10	1220	1920	2250	1320	2150	2480	1820	2740	3000	154/70 kA[1)]
2 x 30 x 10	840	1320	1530	900	1440	1680	1250	1840	2000	105/50 kA[2)]

1) From an enclosure width of 800 mm, a third support must be installed floating in the centre of the section
2) From an enclosure width of 1000 mm, a third support must be installed floating in the centre of the section
3) Up to 4100 A possible with connected units or rails

Table 16: I_{nc} of main busbar up to 6300 A (roof section)

Busbar	IP54				IP2X				IP54 vent./ IP2X vent.		I_{pk}/I_{cw}
	30 K	65 K	70 K	85 K	30 K	65 K	70 K	74 K	30 K	68 K	
	[A]				[A]				[A]		
2 x 4 x 50 x 10	2720	4360	4600	5200	3400	5740	6050	6300	4500	6300	220/100 kA

Table 17: I_{nc} of main busbar (rear centre section)

Busbar	IP 54					IP 2X					IP 54 vent./IP 2X vent.				I_{pk}/I_{cw}
	30 K	65 K	70 K	85 K	95 K	30 K	65 K	70 K	85 K	95 K	30 K	65 K	70 K	85 K	
	I_{nc} [A]					I_{nc} [A]					I_{nc} [A]				
4 x 50 x 10	1200	1880	1940	2220	2430	1520	2400	2520	2820	–	2580	3770	3910	4260	220/100 kA[1)]
4 x 50 x 10	1200	1880	1940	2220	2430	1520	2400	2520	2820	–	2580	3770	3910	4260	143/65 kA[2)]
2 x 50 x 10	960	–	1510	–	1750	1020	–	1610	–	1900	1500	–	2240	2470	143/65 kA[3)]

1) From an enclosure width of 800 mm, a third support must be installed floating in the centre of the section
2) From an enclosure width of 800 mm, Model No. 9686.820 must be used
3) From an enclosure width of 800 mm, Model No. 9686.810 must be used

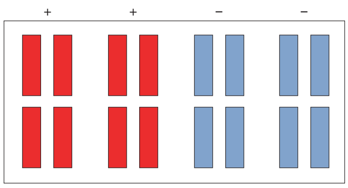
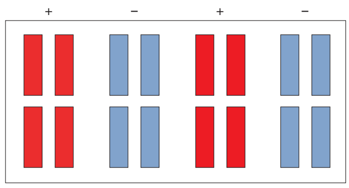
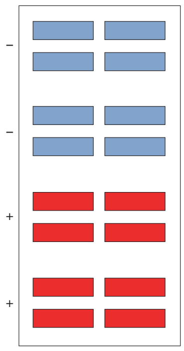
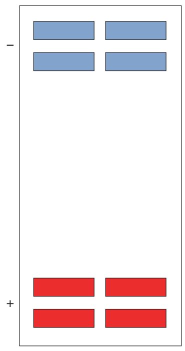
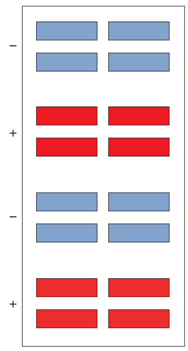
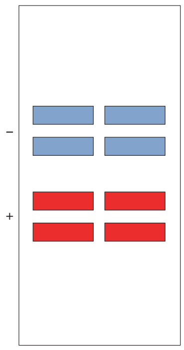
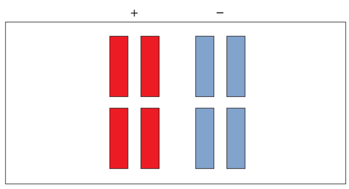
Table 18: Rated busbar currents RiLine

Rated AC currents of RiLine busbar systems up to 60 Hz for uncoated copper bars in A										I_{pk}/I_{cw}
Busbar system	VX25 Ri4Power DIN 43 671 in free air	Protection category of enclosure								
		IP2X vent.		IP2X		IP54 vent.		IP54		
	ΔT = 30 °K	ΔT = 30 °K	ΔT = 70 °K	ΔT = 30 °K	ΔT = 70 °K	ΔT = 30 °K	ΔT = 70 °K	ΔT = 30 °K	ΔT = 70 °K	
SV 9340.000/ SV 9686.100 (30 x 5)	379	415	650	370	580	370	580	325	510	52.5/25 kA
SV 9340.000/ SV 9686.100 (30x10)	573	635	1000	575	900	575	900	510	800	77.7/37 kA 105/50 kA
SV 9342.004/ SV 9686.100 (2 x 30 x 10)	1368[3)]	1020	1600	895	1400	895	1400	735	1150	50/105 kA 65/143 kA

VX25 Ri4Power

System overview of the main busbar

Table 19: I_{pk}/I_{cw} for DC application

Positioning of the IP code	I_{pk}/I_{cw}
     	200/124 kA
 	160/123 kA

System overview of the main busbar

Busbar short-circuit withstand strength

Table 20: Main busbars

Busbar	I_{pk}/I_{cw}	Test report no.
2 x 30 x 10	105/50 kA	2018-0141702
4 x 30 x 10	154/70 kA	2018-0141702
2 x 50 x 10	143/65 kA	2018-0141802
4 x 50 x 10	220/100 kA	09750-19-0064 and 08735-18-550

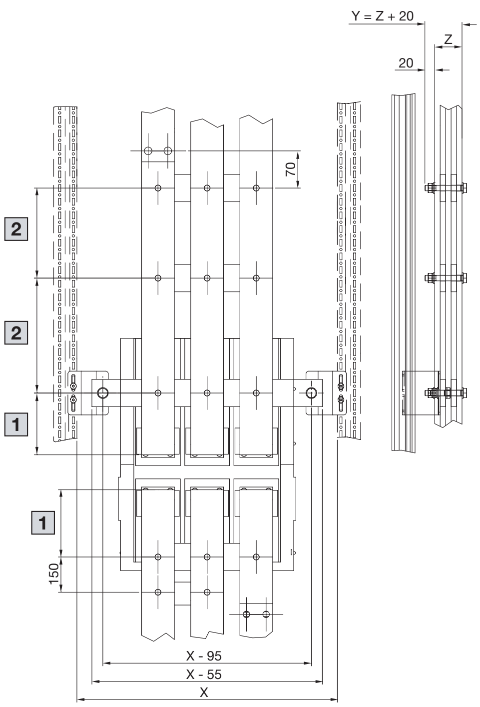
Note to table 20 regarding number of busbar supports

For enclosure width mm	Number of supports
400, 600	2
800, 1000, 1200	3

Stabilising the switch connection

Design with connector kit SV 9660.205

Support for connector kit SV 9660.205



1	First support spacing (clamping point) according to ACB manufacturers
2	I_{pk}/I_{cw} 105/50 kA ≤ 400 mm 187/85 kA ≤ 375 mm 220/100 kA ≤ 300 mm

Table 21: Cable - connection in stepped form with Maxi-PLS

	I_{cw} kA			Max. I_{nc} Ampere		
Width mm	**Maxi-PLS 45 S**	**Maxi-PLS 45**	**Maxi-PLS 60**	**Maxi-PLS 45 S**	**Maxi-PLS 45**	**Maxi-PLS 60**
400	50	100	100	1900	2500	6300
600	50	100	100	1900	2500	6300
800	50	100	100	1900	2500	6300
1000	50	100	100	1900	2500	6300
1200	50	100	100	1900	2500	6300

The VX25 Ri4Power mounting instructions must be taken into account.

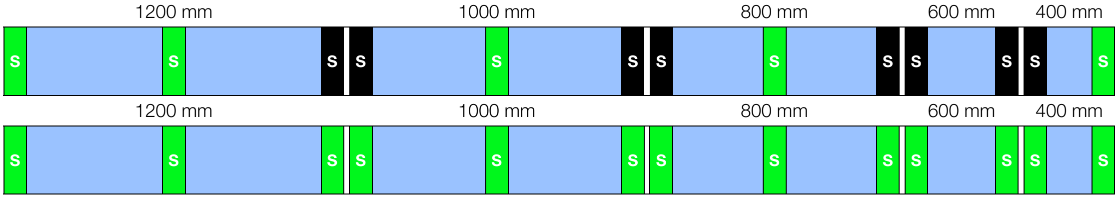
VX25 Ri4Power

System overview of the main busbar

Position of the busbar supports depending on the enclosure width

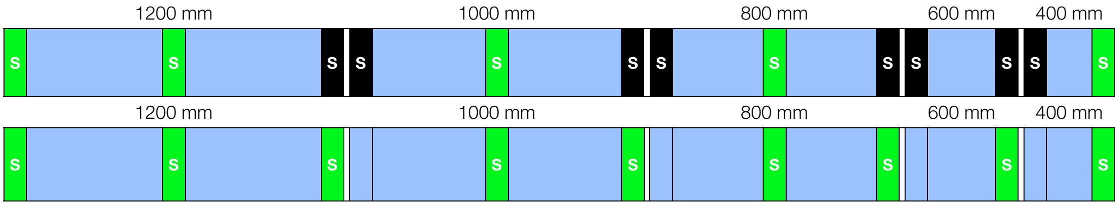
Roof 220 kA
4 x 50 100 kA
with longitudinal connectors

Roof 220 kA
4 x 50 100 kA
without longit. connectors



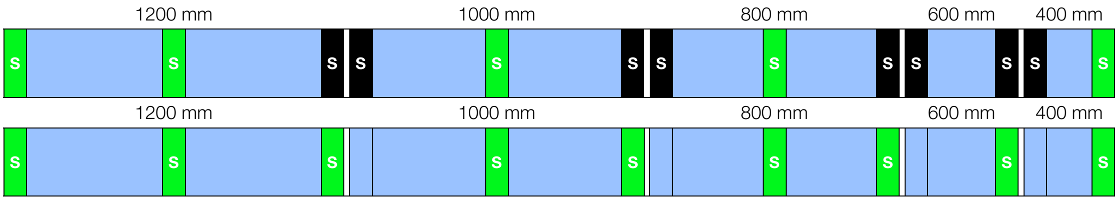
Roof 143 kA
2 x 50 65 kA
with longitudinal connectors

Roof 143 kA
2 x 50 65 kA
without longit. connectors



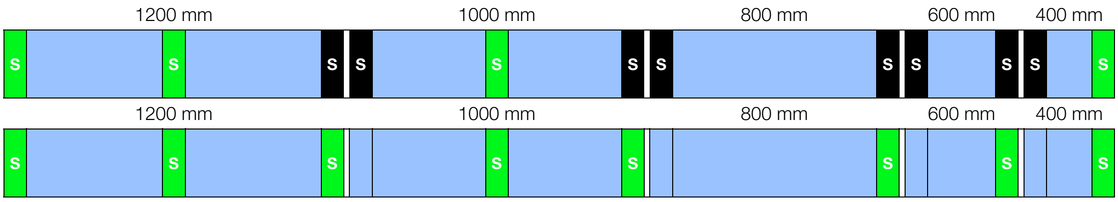
Roof 154 kA
4 x 30 70 kA
with longitudinal connectors

Roof 154 kA
4 x 30 70 kA
without longit. connectors



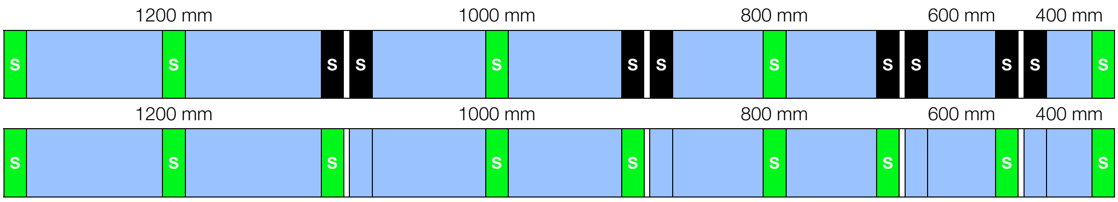
Roof 105 kA
2 x 30 50 kA
with longitudinal connectors

Roof 105 kA
2 x 30 50 kA
without longit. connectors



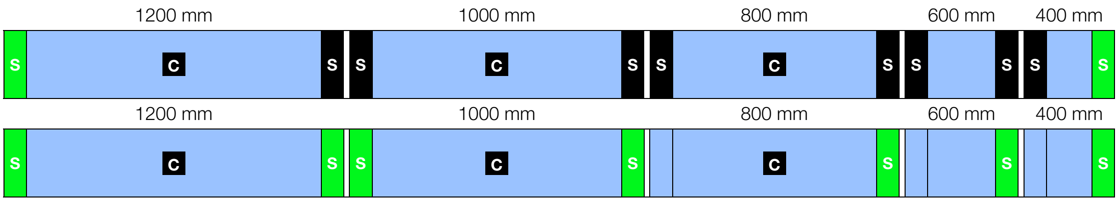
Rear section 220 kA
4 x 50 100 kA
with longitudinal connectors

Rear section 220 kA
4 x 50 100 kA
without longit. connectors



Rear section 143 kA
4/2 x 50 65 kA
with longitudinal connectors

Rear section 143 kA
4/2 x 50 65 kA
without longit. connectors



Key

C Connection set SV 9686.810 or SV 9686.820

S Busbar support
without baying (roof section) 9686.010 or SV 9686.040
without baying (rear section) SV 9686.070

S Busbar support
for baying (roof section) 9686.030 or SV 9686.000
for baying (rear section) SV 9686.060

No busbar support

For sections up to 70 kA and width ≤ 800 mm and longitudinal connection, the third support in the centre of the field may be omitted

Note: In the Power Engineering software, two holders are always listed for one section baying.

VX25 Ri4Power

Application, definitions and basic principles

Application

This Technical System Catalogue is intended to provide information for the planning, configuration and manufacture of low-voltage switchgear with the products from the VX25 Ri4Power modular system.

All references made in this document to standards refer to edition 3 of IEC 61 439-1/-2 2019 and DIN EN 61 439-1/-2 2021.

Definitions and basic principles

Before starting to plan a low-voltage switchgear assembly, the following parameters should be agreed with the subsequent user of the low-voltage switchgear:

Rated data	**Standard IEC 61 439 Sub-point**	see page
Rated voltage U_n	5.2.1	92
Rated operating voltage U_e (of a circuit in a switchgear assembly)	5.2.2	92
Rated insulation voltage U_i	5.2.3	93
Rated impulse withstand voltage U_{imp}	5.2.4	93
Rated current of switchgear assembly I_{nA}	5.3.1	93
Rated current of an outgoing main circuit I_{nc}	5.3.2	93
Rated operating current of a main circuit I_{ng}	5.3.3	93
Rated peak withstand current I_{pk}	5.3.4	94
Rated short-time withstand current I_{cw}	5.3.5	94
Conditional rated short-circuit current I_{cc}	5.3.6	94
Rated diversity factor RDF	5.4	94
Rated frequency f_n	5.5	94

Other technical features	**Standard IEC 61 439 Chapter**	see page
Additional requirements depending on special operating conditions	5.6.a	95
Pollution degree	5.6.b	95
Material group	Table 2	95
Type of system earthing	5.6.c	95
Indoor/outdoor installation	5.6.d	95
Stationary/movable installation of low-voltage switchgear	5.6.e	96
Protection category	5.6.f	96
Use by skilled or ordinary persons	5.6.g	96
Electromagnetic compatibility (EMC) classification	5.6.h	97
Special service conditions	5.6.i	97
External design	5.6.j	97
Mechanical impact protection	5.6.k	97
Type of construction	5.6.l	97
Type of short-circuit protection devices	5.6.m	98
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Rated voltage U_n

Reference chapter 5.2.1 [of standard IEC 61 439-1]

This is the highest rated AC voltage (root-mean-square value) or DC voltage for which the main circuits of the switchgear assembly are designed [pursuant to IEC 61 439-1, section 3.8.9.1].

The maximum possible rated value with the VX25 Ri4Power system is 690 V AC.

The rated voltage may be dimensioned to a lower rated value of the planned switchgear assembly. In such cases, it is important to ensure that all operating equipment connected to the main circuit is suitable for this rated value.

Rated operating voltage U_e (of a circuit in a switchgear assembly)

Reference chapter 5.2.2 [of standard IEC 61 439-1]

If the rated voltage of an outgoing circuit deviates from the specified rated voltage U_n, a separate rated operating voltage must be given for that circuit [pursuant to IEC 61 439-1, section 3.8.9.2].

This value must not exceed the maximum rated voltage of the VX25 Ri4Power system of 690 V AC.

Rated insulation voltage U_i

Reference chapter 5.2.3 [of standard IEC 61 439-1]

Withstand voltage (root-mean-square value) specified for a piece of operating equipment or part of the low-voltage switchgear indicating the specified withstand capacity of the affected insulation [to IEC 61 439-1, section 3.8.9.3]. The maximum possible rated value with the VX25 Ri4Power system is 1000 V AC.

A smaller rated value may be specified for the low-voltage switchgear or part thereof. It is important to ensure that all operating equipment connected to the circuit meets this rated value, and that this value is greater than or equal to the rated voltage U_n and the rated operating voltage U_e of the affected circuit.

Rated impulse withstand voltage U_{imp}

Reference chapter 5.2.4 [of standard IEC 61 439-1]

Withstand surge voltage indicating the isolator's ability to withstand a transient overvoltage [to IEC 61 439-1, section 3.8.9.4].

The maximum possible rated value with the VX25 Ri4Power system is 12 kV.

A smaller rated value may be specified. Measures must be taken to ensure that the surge voltage resistance of all operating equipment connected to the circuit is greater than or equal to the transient overvoltage that may arise in this system.

Rated current of switchgear assembly I_{nA}

Reference chapter 5.3.1 [of standard IEC 61 439-1]

The rated current of a switchgear assembly is the current that is fed into a low-voltage switchgear via one infeed or multiple parallel infeeds and distributed via the main busbar system [pursuant to IEC 61 439-1, section 3.8.10.7].

There is no specified maximum value for the VX25 Ri4Power system, since the breakdown into multiple busbar sections and the associated addition of busbar currents means that the system current can be a multiple of the admissible currents.

Dimensioning to a lower rated voltage is possible by selecting smaller busbar systems.

Note:
The rated current of a busbar system in a switchgear may be smaller than the rated current of a switchgear, provided measures are taken to ensure that the admissible rated current is not exceeded at any point in the busbar. For example, this is possible with a centre infeed or multiple infeeds distributed over the low-voltage switchgear.

Rated current of an outgoing main circuit I_{nc}

Reference chapter 5.3.2 [of standard IEC 61 439-1]

The rated current of a main circuit is the value which may be routed via this circuit, while adhering to all overtemperatures. The rated currents of the individual devices used in this circuit may well have higher values. The user must determine the rated currents for each circuit. The switchgear manufacturer must select suitable devices and ensure that these are capable of carrying the requisite rated current I_{nc} under the conditions in the switchgear [pursuant to IEC 61 439-1, section 3.8.10.5].

The maximum admissible rated currents for a circuit, with due regard for the device types and sizes of the different switchgear brands and the protection category achieved, are shown in the tables from page 133.

Rated operating current of a main circuit I_{ng}

Reference chapter 5.3.3 [of standard IEC 61 439-1]

Rated current that a main circuit can carry, taking into account the mutual thermal influences of the other circuits simultaneously loaded in the same section of the switchgear assembly [pursuant to IEC 61 439-1, section 3.8.10.6].

The I_{ng} can be the same as the I_{nc} for some versions of switchgear assemblies.

A switchgear assembly can also consist of only one section.

Application, definitions and basic principles

Rated peak withstand current I_{pk}

Reference chapter 5.3.4 [of standard IEC 61 439-1]

The rated peak withstand current is the maximum instantaneous value of the short-circuit current a switchgear assembly can withstand [pursuant to IEC 61 439-1, section 3.8.10.2].

The rated peak withstand current of the low-voltage switchgear must be greater than or equal to the specified peak value of the prospective peak current that may flow through the low-voltage switchgear.

With VX25 Ri4Power, this rated value may be adjusted by selecting various busbar systems according to requirements. In this connection, please also refer to page 105, design of the busbar systems.

Rated short-time withstand current I_{cw}

Reference chapter 5.3.5 [of standard IEC 61 439-1]

The rated short-time withstand current I_{cw} is a root-mean-square value of the short-circuit current, described by the current and duration a switchgear assembly can withstand under the specified conditions [pursuant to IEC 61 439-1, section 3.8.10.10].

The rated short-time withstand current of the low-voltage switchgear must be greater than or equal to the prospective rms value of the short-circuit current of the supply system to which the circuit is designed to be connected. When defining the rated short-time withstand current I_{cw} a period of time must always be specified. The rated short-time withstand current Icw is generally stated for a period of 1 second.

With VX25 Ri4Power, this value may be adjusted by selecting the various busbar systems according to requirements. The short-circuit withstand strength can additionally be increased by means of various measures, such as the use of busbar claws or stabilisers. In this connection, please also refer to page 105, design of the busbar systems.

Conditional rated short-circuit current I_{cc}

Reference chapter 5.3.6 [of standard IEC 61 439-1]

The conditional rated short-circuit current is the root-mean-square value of the prospective short-circuit current of a power supply which a switchgear assembly protected by a short-circuit protection device or a circuit can withstand for the entire break time of the short-circuit protection device [pursuant to IEC 61 439-1, section 3.8.10.4] This short-circuit protection device can be positioned within a switchgear assembly or fitted outside of the protected switchgear assembly in the outgoing feeder circuit of the supplying switchgear assembly.

The conditional rated short-circuit current of the low-voltage switchgear must be greater than or equal to the prospective root-mean-square value of the short-circuit current that may be supplied to the low-voltage system, the duration of which is limited by a short-circuit protection device (fuse, circuit-breaker, etc.).

Rated diversity factor RDF

Standard reference chapter 5.4 [to IEC 61 439-1]

The rated diversity factor is the factor with which the outgoing feeders of a low-voltage switchgear may be continuously and simultaneously operated, with due regard for reciprocal thermal influences. This factor may be given for individual circuits, groups of circuits as well as for the entire low-voltage switchgear system.

The rated diversity factor refers to the rated currents of the circuits, and not to the rated currents of the switchgear and protective gear.

In VX25 Ri4Power, this rated diversity factor depends on the system design. Further details may be found in the descriptions of the switchgear section types.

Rated frequency f_n

Reference chapter 5.5 [of standard IEC 61 439-1]

The rated frequency of a circuit is given for the specific operating condition. If circuits with different frequencies are used in a low-voltage switchgear, separate values must be given for each circuit.

All VX25 Ri4Power components are designed for a nominal value of 50 Hz. Any uses that deviate from this should be agreed with the Rittal Technical Support team.

Application, definitions and basic principles

Additional requirements / features depending on the specific operating conditions

Reference chapter 5.6.a [of standard IEC 61 439-1]

This point is used to specify any additional requirements which must be observed if a functional unit is operating in special conditions, such as special altitudes (> 2000 m above mean sea level), type of selectivity or overload characteristics.

Pollution degree

Reference chapter 5.6.b [of standard IEC 61 439-1]

The pollution degree is a ratio indicating the influence of dust, gas, dirt, salt, etc. on reducing dielectric strength and/or surface resistance. The admissible creepage distances and minimum gap widths of the operating equipment are dependent on this value.

The VX25 Ri4Power system, including all busbar and connection components, is designed for pollution degree 3. In other words, the requirements of pollution degrees 1 and 2 are also met. Pollution degree 4 is not designed for switchgear assemblies.

If there is no pollution degree prescribed for a switchgear assembly, pollution degree 3 should always be assumed for industrial applications.

Pollution degree table (to DIN EN 60 664-1):

Pollution degree 1: No pollution or only dry, non-conductive pollution. Pollution has no effect on the operational performance of the switchgear assembly.

Pollution degree 2: Only non-conductive pollution, although temporary conductivity caused by condensation is to be expected.

Pollution degree 3: Conductive pollution or dry, non-conductive pollution which may become conductive due to condensation.

Pollution degree 4: Persistent conductivity caused by conductive dust, rain or moisture.

Material group

Reference to table 2 [of standard IEC 61 439-1]

To define the creepage distances on insulating components, it is necessary to specify the material group of the insulating materials used, as well as the pollution degree.

As a minimum, the insulating materials of the busbar supports used in VX25 Ri4Power meet the requirements of material group IIIa with a CTI of between 175 and 400 (CTI = comparative tracking index).

All VX25 Ri4Power components, provided they are used correctly, meet the minimum creepage distance of 16 mm required in conjunction with pollution degree 3 and a rated insulation voltage U_i of 1000 V.

Type of earthing

Reference chapter 5.6.c [of standard IEC 61 439-1]

The internal configuration of the main conductors, particularly the neutral conductors and PE conductors, is defined by specifying the type of earthing for which the switchgear assembly is designed.

VX25 Ri4Power supports various systems. Using the Rittal Power Engineering software allows the operator to configure the conductors to match the type of earthing with a simple selection process.

Indoor/outdoor installation

Reference chapter 5.6.d [of standard IEC 61 439-1]

For system installation, we distinguish between indoor and outdoor installation.

VX25 Ri4Power low-voltage systems are designed for indoor installation, and all tightening torques and corrosion resistance have been calculated accordingly.

For installation conditions that deviate from this, where applicable, the torques will need to be adjusted. However, the maximum admissible torques for the connection components must not be exceeded.

Application, definitions and basic principles

Stationary/movable installation of low-voltage switchgear

Reference chapter 5.6.e [of standard IEC 61 439-1]

A low-voltage switchgear is described as movable if it is easily moved from one installation site to another.

If a low-voltage switchgear is permanently installed and operated, it is described as stationary.

VX25 Ri4Power low-voltage switchgear may be used for both types of operation. However, for mobile use, special measures must be taken by the manufacturer of the switchgear assembly, such as stable, torsionally stiff transport plinths, defined servicing intervals for screw connections etc.

Degree of protection

Reference chapter 5.6.f [of standard IEC 61 439-1]

An enclosure's degree of protection describes the requirements for protection from solid and liquid media coming into contact with the low-voltage switchgear. The different requirements and test methods are described in IEC 60 529.

VX25 Ri4Power offers different degrees of protection as standard: IP54, IP4X, IP41 and IP2X.

The higher the chosen degree of protection, the higher the factors for reducing the rated currents of the operating equipment used. Furthermore, at high degrees of protection, high interior temperatures arise in the low-voltage switchgear, which may adversely affect the service life of the operating equipment.

For this reason, wherever the usage options allow, low-voltage systems should be designed with a low degree of protection in order to ensure the best possible heat dissipation.

If a low-voltage system is placed in an electrical operating room, IP54 protection is not necessarily required, and greater attention should be devoted to the leak-tightness of the cable entry into this operating room.

Use by skilled or ordinary persons

Reference chapter 5.6.g [of standard IEC 61 439-1]

A qualified electrician is an individual whose training and experience enables them to identify the risks and potential dangers associated with electricity [pursuant to IEC 61 439-1, section 3.7.12].

A person trained in electrical engineering has been adequately informed or monitored by a qualified electrician and is therefore able to identify the risks and dangers associated with electricity [pursuant to IEC 61 439-1, section 3.7.13].

An ordinary person is a person who is not a qualified electrician and does not have any training in electrical engineering [pursuant to IEC 61 439-1, section 3.7.14].

The suitability of low-voltage switchgear for use by ordinary persons ends at a rated current of 250 A and is limited to a maximum rated short-time withstand current I_{cw} of 10 kA and to operating equipment with a rated current of max. 125 A.

Application, definitions and basic principles

Electromagnetic compatibility (EMC) classification

Reference chapter 5.6.h [of standard IEC 61 439-1]

Electromagnetic compatibility refers to freedom from emitted interference and immunity to interference of electrical and electronic devices in relation to their environment. With EMC, we distinguish between two different environments:
Environment A refers to non-public or industrial low-voltage networks/areas/equipment that contain powerful sources of interference.
Environment B refers to public low-voltage networks to supply residential buildings, commercial premises or small industrial operations.

The required operating environment should be specified by the user.

The VX25 Ri4Power system is suitable for both environments. When using equipment that may cause electromagnetic interference, always follow the equipment manufacturer's instructions regarding installation and connection of the device.

When implementing devices or assemblies with EMC relevance, Annex J of IEC 61 439-1 must be observed.

Special service conditions

Reference chapter 5.6.i [of standard IEC 61 439-1]

Under special service conditions, the parameters for ambient temperature, relative humidity and/or altitude should be separately defined if these deviate from the relevant provisions in the product standard (IEC 61 439-2).
This also includes information such as:

- Values for ambient temperature, relative humidity and/or altitude which deviate from the standard values in IEC 61 439, section 7.1
- Rapid changes in temperature or air pressure
- Special atmospheres (smoke, corrosive gases, special dust)
- Effect of powerful electrical or magnetic fields
- Effect of extreme climatic conditions
- Effect of fungi or small animals (rodent protection)
- Installation in areas at risk of fire or explosion
- Occurrence of heavy vibrations and impacts
- Special siting locations (wall niches) that may influence current-carrying capacity, for example
- Operational interference from external EMC influences
- Exceptional occurrence of overvoltage
- Excessive harmonics in the supply voltage or load current

The VX25 Ri4Power system has been designed for the temperatures and atmospheric conditions outlined in standard IEC 61 439-1.

Service condition	Admissible value range
Max. ambient temperature	< = +40 °C, whereby the mean over 24 h must not exceed 35 °C
Min. ambient temperature	>= -5 °C
Relative humidity	< = 50% (at max. +40 °C)
Relative humidity	< = 90% (at max. +20 °C)
Altitude	< = 2000 m asl

Any requirements deviating from this can be met with additional special measures or deratings.

External design

Reference chapter 5.6.j [of standard IEC 61 439-1]

The VX25 Ri4Power system has been extensively tested on a single or multiple enclosure design in solid form.

Mechanical impact protection

Reference chapter 5.6.k [of standard IEC 61 439-1]

Testing the enclosure for mechanical impact protection specifies the IK protection category. This value defines the enclosure cover's resistance to mechanical impact and damage.

For VX25 Ri4Power enclosures, a protection category of IK10 has been verified, and therefore all lower IK protection categories IK00 – IK09 are likewise covered.

VX25 Ri4Power

Application, definitions and basic principles

Type of construction

Reference chapter 5.6.l [of chapter IEC 61 439-1]

This parameter defines the design of active operating equipment. A distinction is made between "fixed parts" and "removable parts".

A fixed part is an assembly of operating equipment that is assembled/wired onto a shared supporting structure (e.g. mounting plate) and may only be installed/connected to the low-voltage switchgear in a de-energised state with the use of tools.

A removable part is distinguished by the fact that the assembly may be installed and removed with the low-voltage switchgear live. This is possible, for example, with switchgear designed as rack-mounted equipment, or slide-in modules.

The VX25 Ri4Power system supports both options with different field types.

Type of short-circuit protection devices

Reference chapter 5.6.m [of standard IEC 61 439-1]

The type of protection devices to be used must be agreed between the manufacturer of the low-voltage switchgear assembly and the user.

The protective devices upstream of the low-voltage switchgear assembly, as well as the selectivity and backup protection specifications, must also be taken into account.

Depending on the design of the short-circuit protection device, the rated short-time withstand current I_{cw} and the rated peak withstand current I_{pk} or alternatively the rated conditional short-circuit current I_{cc} should be specified as the rated values.

Measures for protection against electric shock

Reference chapter 5.6. n [of standard IEC 61 439-1]

The protective measures to be taken must be agreed and must be implemented by the manufacturer of the low-voltage switchgear assembly. IEC 61 439 provides further information and clarification of this area in section 8.4.

Overall dimensions

Reference chapter 5.6.o [of standard IEC 61 439-1]

The overall dimensions of the low-voltage switchgear assembly must be specified by the user and manufacturer.
The manufacturer must take account of protruding components such as handles, panels, doors and fitted elements.

When specifying the dimensions of the transport units, the transportation methods for delivery, integration and installation must also be borne in mind.

Mass

Reference chapter 5.6.p [of standard IEC 61 439-1]

The weights of the transport units or of the complete low-voltage switchgear assembly should be specified, particularly when max. permissible weights must be observed for the delivery and transportation of low-voltage switchgear assemblies.

Where necessary, this information must also be borne in mind by the user during building and room planning.

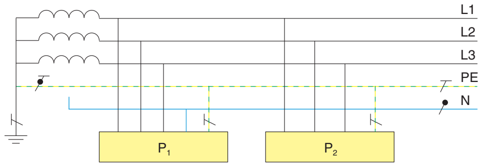
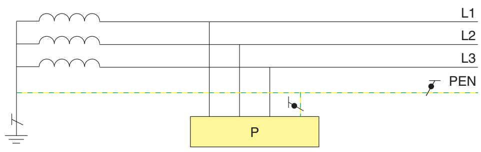
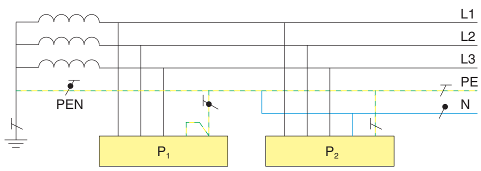
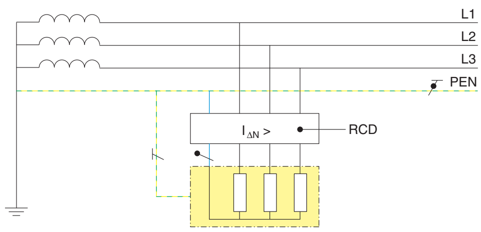
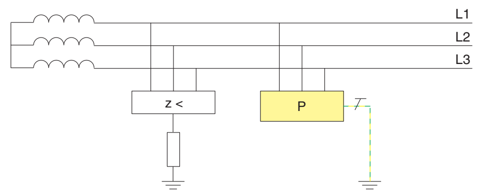
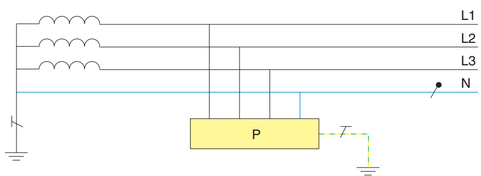
VX25 Ri4Power

Application, definitions and basic principles

TN, IT, TT network configuration

According to the wording of the standard, network configurations are also referred to as “earthing type systems”.

The VX25 Ri4Power system is suitable for different network configurations. The different designs of the PE conductor system and the system assembly support a range of network configurations.

Description	Circuitry
TN-S system (TN-S network)	
TN-C system (TN-C network)	
TN-C-S system (TN-C-S network)	
TN system (TN network) with residual-current circuit-breaker (FI circuit-breaker RCD)	
IT system (IT network)	
TT system (TT network)	

VX25 Ri4Power

Application, definitions and basic principles

Selection parameters

Table 22: Determination to standard IEC/DIN EN 61 439-1, Annex C

Functions and features to be determined by the user in accordance with IEC/DIN EN 61 439-1	Reference to chapter	Recommended value[1)]	User requirements[2)]
Electrical system			
System according to type of earth connection	5.6, 8.4.3.1, 8.4.3.2.3, 8.6. 2, 2772, 11.4	Manufacturer's standard version, selected to meet local requirements	
Rated voltage (V)	3.8.9.1, 5.2.1, 8.5.3	According to local installation conditions	
Transient overvoltages	5.2.4, 8.5.3, 9.1 Annex G	Determined by the electrical system	
Temporary overvoltages	9.1	Rated system voltage + 1200 V	
Rated frequency f_n (Hz)	3.8.11, 5.5, 8.5.3, 10.10.2.3, 10.11.5.4	According to local installation conditions	
Additional requirements for on-site testing: Wiring, operating response and function	11.10	Manufacturer's standard version, according to application	
Short-circuit withstand strength			
Prospective short-circuit current at supply terminals I_{cp} (kA)	3.8.7	Determined by the electrical system	
Prospective short-circuit current in the neutral conductor	10.11.5.3.5	Max. 60% of the phase conductor value	
Prospective short-circuit current in the protective circuit	10.11.5.6	Max. 60% of the phase conductor value	
Requirement, if SCPD in the incoming functional unit	9.3.2	According to local installation conditions	
Co-ordination of short-circuit protective devices including external short-circuit protective device details	9.3.4	According to local installation conditions	
Data relating to loads likely to contribute to the short-circuit current	9.3.2	No loads permissible which are likely to contribute to the short-circuit current	
Protection of persons against electric shock in accordance with IEC 60 364-4-41:2005 and IEC 60 364-4-41: 2005/AMD1:2017			
Type of protection against electric shock – Basic protection (protection against direct contact)	8.4.2	Basic protection	
Type of protection against electric shock – Fault protection (protection against indirect contact)	8.4.3	According to local installation conditions	
Installation environment			
Location type	3.5, 8.1.4, 8.2	Manufacturer's standard version, according to application	
Protection against ingress of solid foreign bodies and ingress of water	8.2.2, 8.2.3	Indoors (solid): IP2x Open-air installation (min.): IP23	
External mechanical impact (IK)	8.2.1, 10.2.6	None	
Resistance to UV radiation (only applies to open-air installation unless otherwise specified)	10.2.4	Indoors: not applicable Open-air installation: moderate climate	
Corrosion resistance	10.2.2	Normal Indoors/open-air installation	
Ambient temperature – Lower limit	7.1.1	Indoors: -5 °C Open-air: -25 °C	
Ambient temperature – Upper limit	7.1.1	40 °C	
Ambient temperature – Maximum daily mean	7.1.1, 9.2	35 °C	
Maximum humidity	7.1.1	Indoors: 95% at -5 °C to +30°C 70% at +35°C 57% at +40°C Open-air: 100% at -25 °C to +27°C 60% at 35°C 46% at 40°C	
Pollution degree	7.1.2	Industrial: 3	
Height	7.1.1	< 2000 m	
EMC environment (A or B)	9.4, 10.12 Annex J	A/B	
Special operating conditions (e.g. vibrations, exceptional moisture condensation, heavy contamination, corrosive atmosphere, powerful electrical or magnetic fields, fungi, small animals, risk of explosion, heavy vibrations and impacts, earthquakes)	7.2, 8.5.4, 9.3.3, table 7	No special operating conditions	

1) In certain cases, data from the manufacturer of the switchgear assembly may be used instead of an agreement of this nature.
2) With exceptionally difficult applications, it may be necessary for the user to specify more stringent requirements than those set out in this standard.

VX25 Ri4Power

Application, definitions and basic principles

Functions and features to be determined by the user in accordance with IEC/DIN EN 61 439-1	Reference to chapter	Recommended value[1)]	User requirements[2)]
Installation method			
Type	3.3, 5.6	Manufacturer’s standard version	
Movable or stationary	3.5	Stationary	
Maximum overall dimensions and mass	5.6, 6.2.1	Manufacturer's standard version, according to application	
Type(s) of conductor inserted from outside	8.8	Manufacturer’s standard version	
Location of conductors inserted from outside	8.8	Manufacturer’s standard version	
Material of conductors inserted from outside	8.8	Copper	
External phase conductor, cross sections, and terminations	8.8	As specified in the standard	
External PE, N, PEN conductors, cross sections, and terminations	8.8	As specified in the standard	
Special terminal identification requirements	8.8	Manufacturer’s standard version	
Storage and handling			
Maximum dimensions and mass of transport units	6.2.2, 10.2.5	Manufacturer’s standard version	
Type of transport (e.g. crane, forklift)	6.2.2, 8.1.6	Manufacturer’s standard version	
Ambient conditions that deviate from the operating conditions	7.3	Such as conditions during operation	
Packaging details	6.2.2	Manufacturer’s standard version	
Operating arrangements			
Access to manually operated devices	8.4		
Arrangement of manually operated devices	8.5.5	Easy access	
Isolation of load installation equipment items	8.4.2, 8.4.3.3, 8.4.6.2	Manufacturer’s standard version	
Maintenance and upgrade capabilities			
Requirement concerning accessibility during operation for untrained persons, requirement to operate devices or replace components whilst the switchgear enclosure is live	8.4.6.1	Basic protection	
Requirements related to accessibility for inspection and similar operations	8.4.6.2.2	No accessibility requirements	
Requirements related to accessibility for maintenance in service by authorised persons	8.4.6.2.3	No accessibility requirements	
Requirements related to accessibility during operation for extension by authorised persons	8.4.6.2.4	No accessibility requirements	
Type of electrical connection of functional units	8.5.1, 8.5.2	Manufacturer’s standard version	
Protection against electric shock from direct contact with dangerous active interior parts during servicing or extension (e.g. functional units, main busbars, distribution busbars)	8.4	No protection requirements during maintenance or extension	
Current carrying capacity			
Rated current of switchgear assembly I_{nA} (A)	3.8.9.1, 5.3, 8.4.3.2.3, 8.5.3, 8.8, 10.10.2, 10.10.3, 10.11.5, Annex E	Manufacturer's standard version, according to application	
Intended operating current I_B (A)	3.8.10.8	Manufacturer's standard version, according to application	
Ratio of the neutral conductor cross-section to the phase conductor cross-section: Phase conductors up to and including 16 mm^2	8.6.1	100%	
Ratio of the neutral conductor cross-section to the phase conductor cross-section: Phase conductors larger than 16 mm^2	8.6.1	50% (min. 16 mm^2)	

1) In certain cases, data from the manufacturer of the switchgear assembly may be used instead of an agreement of this nature.
2) With exceptionally difficult applications, it may be necessary for the user to specify more stringent requirements than those set out in this standard.

Taken from standard EN 61 439-1.

VX25 Ri4Power

Project checklist for Rittal VX25 Ri4Power low-voltage switchgear and controlgear assemblies

Project	
Project name	
Switchgear manufacturer	
End client/customer number	
Field service employee	
In-house employee	
Completion by	

System specifications				
1.	Climatic conditions			
2.	Altitude above sea level	m		
3.	Average ambient temperature over 24 h	°C		
4.	Special conditions			
5.	Max. plant dimensions	Height mm	Depth mm	Base/plinth mm
6.	Switch room features			
7.	Standards and provisions			

Mains infeed data		
1.	Network configuration	
2.	Short-circuit current of infeeding supply grid I_{cw}/1 sec.	kA
3.	No. of transformers	Transformer capacity

Assembly and installation				
1.	Type of installation			
2.	Restriction to overall length	☐ Yes	☐ No	mm
3.	Base/plinth	☐ 100 mm	☐ 200 mm	☐ No
4.	Contact hazard protection cover	☐ Yes	☐ No	
5.	Maximum length per transport unit	mm		

VX25 Ri4Power

Project checklist for Rittal VX25 Ri4Power low-voltage switchgear and controlgear assemblies

Busbar systems and field equipment				
1.	Rated current of main busbar, horizontal I_{nc}/RDF			
2.	Rated current of distribution busbar, vertical Inc/RDF			
3.	No. of poles, main busbar	☐ 3-pole	☐ 4-pole	☐ 3-pole + separately routed N
4.	No. of poles, distribution busbar	☐ 3-pole	☐ 4-pole	
5.	Protection category	Roof plate	Front trim panel	
6.	Form separation, incoming sections	☐ 1 ☐ 2a ☐ 2b	☐ 3a ☐ 3b	☐ 4a ☐ 4b
7.	Form separation, module sections	☐ 1 ☐ 2a ☐ 2b	☐ 3a ☐ 3b	☐ 4a ☐ 4b
8.	Form separation, fuse-switch disconnector sections	☐ 1 ☐ 2a ☐ 2b	☐ 3a ☐ 3b	☐ 4a ☐ 4b
9.	Extraordinary enclosure requirement	RAL colour		
10.	Deviant definitions or standards			
11.	PE conductor/neutral conductor	☐ PE ☐ 30 x 10 mm ☐ 40 x 10 mm ☐ 80 x 10 mm	☐ PEN ☐ 25% ☐ 50% ☐ 100%	☐ N ☐ 25% ☐ 50% ☐ 100%
12.	PE/N-PEN cable chambers	☐ PE ☐ 30 x 10 mm ☐ 40 x 10 mm ☐ 80 x 10 mm	☐ PEN ☐ 25% ☐ 50% ☐ 100%	☐ N ☐ 25% ☐ 50% ☐ 100%

Devices circuit-breakers				
1.	Manufacturer	Model		
2.	Size/device rated current I_n	A		
3.	Design	☐ Rack-mounted unit	☐ Static installation unit	
4.	Rated current I_{nc}/RDF	A		
5.	Switch position	☐ VT (in front of door)	☐ HT (behind the door)	
6.	Neutral conductor	☐ Switched	☐ Unswitched	☐ No neutral conductor
7.	Device modules for circuit-breaker section	☐ Yes	☐ No	
8.	Cable connection/busbar connection	Outgoing	Infeed	
9.	Supply leads per phase	Quantity	Cross-section mm^2	

Device coupling section				
1.	Manufacturer	Model		
2.	Size/device rated current I_n	A		
3.	Design	☐ Rack-mounted unit	☐ Static installation unit	
4.	Rated current I_{nc}/RDF	A		
5.	Switch position	☐ VT (in front of door)	☐ HT (behind the door)	
6.	Neutral conductor	☐ Switched	☐ Unswitched	☐ No neutral conductor

Note:
Please enclose a sketch of the low-voltage switchgear and controlgear assembly with this checklist.

Selection and dimensioning of the main busbar system

Parameters for selection of the main busbar system

The core element for the distribution of electrical power in a low-voltage switchgear is generally the main busbar system. Several points must be taken into account when selecting the busbar system.

The decisive criteria for selection of a main busbar system are:

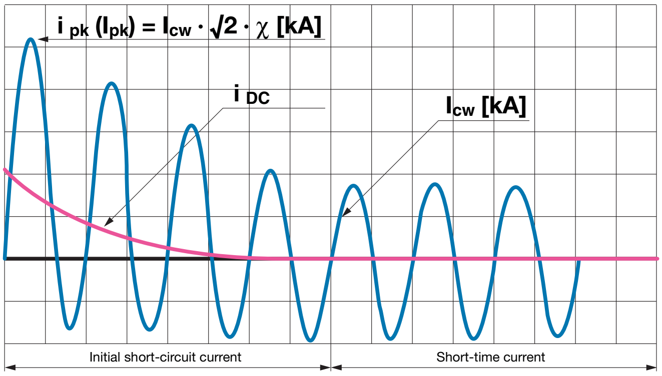
- The rated current of the switchgear assembly I_{nA}, see page 93
- The rated peak withstand current I_{pk}, see page 94
- The rated short-time withstand current I_{cw}, see page 94
- The protection category, see page 96.

In most cases, the external dimensions of the low-voltage switchgear are decisive. Due to the model-based design of the main busbar system, in some main busbar system variants, a restricted range of dimensions is available.

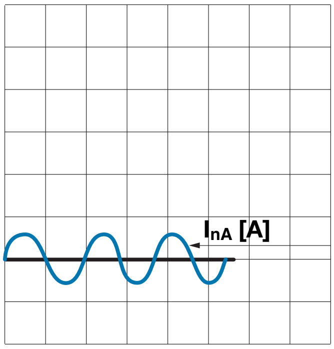
After selecting a busbar system, it is necessary to check that the other criteria for the busbar system are also met, such as rated voltage etc.

Rated peak withstand current I_{pk} and rated short-time withstand current I_{cw}

Short-circuit response



Rated current I_{nA}



Compared with short-circuit currents, the rated current I_{nA} shown on the left is several times smaller.

The rated peak withstand current I_{pk} and the rated short-time withstand current I_{cw} are the principal values for making a statement on the mechanical stability of a busbar system during an electrical short-circuit.

The forces arising during a short-circuit are generally several times higher than the actual weight force of the busbar system. For one thing, different force effects occur during the short-circuit which may act between the individual strands, conductors and the enclosure. The above diagram shows the development of a short-circuit current and indicates the various current values.

At the start of the short-circuit, the peak short-circuit current I_{pk} generates the greatest force effect acting between the components of the busbar system. Once the initial short-circuit current has receded, only the root-mean-square value of the short-circuit current can be measured. The ratio between the peak short-circuit current and the continuous short-circuit current depends inter alia on the level of short-circuit current. Table 23 indicates the ratio pursuant to IEC 61 439-1, table 3. This ratio between the surge current and the short-time current applies to most application cases.

Table 23: Root-mean-square value of the short-circuit current (to IEC 61 439-1, table 7)

Root-mean-square value I_{cw} of the short-circuit current			cos φ	n
–	/ <=	5 kA	0.7	1.5
5 kA	< / <=	10 kA	0.5	1.7
10 kA	< / <=	20 kA	0.3	2
20 kA	< / <=	50 kA	0.25	2.1
50 kA	< /	–	0.2	2.2

The short-time current stresses the busbar system by causing a large temperature rise in the busbars, as well as via the interaction between the magnetic field and the associated interaction between the attracting and repelling forces resulting from this. The rated short-time withstand current I_{cw} is generally given as a value relating to a short-circuit period of 1 second. In some cases or countries, the data may also need to be given for 3 or 5 seconds. In such cases, a 3-second value may be calculated from the available data using the formula $I_1^2 \cdot t_1 = I_2^2 \cdot t_2$.

Using the values rated peak withstand current I_{pk} and rated short-time withstand current I_{cw} it is possible to define the mechanical and thermal stability of a busbar system subjected to the short-circuit.

Selection and dimensioning of the main busbar system

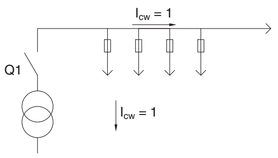
Design of the busbar systems with regard to infeed and rated current I_{nA} and rated short-time withstand current I_{cw}

There are various options for feeding the rated current I_{nA} into a low-voltage switchgear assembly.

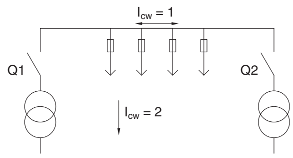
With many applications, the switchgear may only be adequately supplied with one infeed, and the infeed point is on the left or right of the switchgear enclosure. This means that the main busbar and the main switch of the switchgear enclosure must carry the entire current. Alternatively, a switchgear may infeed into the central area and distribute the currents evenly to the left and right via the busbar system. With this arrangement, the heat loss arising in the busbar system can be reduced compared with a single-side infeed, and the cross-section of the main busbar systems may be reduced to the maximum current flowing to the left or right on the main busbar.

Short-circuit current distribution with various infeed variants (disregarding impedance)

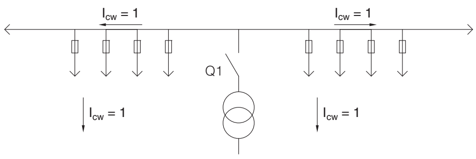
Side infeed



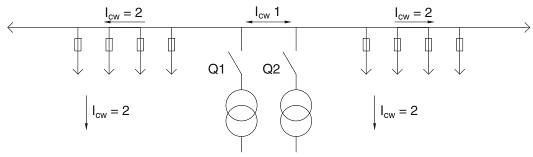
Double infeed left/right



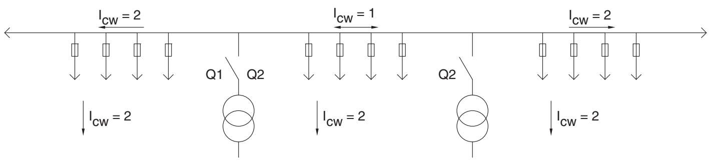
Central infeed



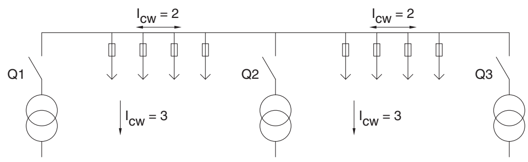
Double central infeed



Double infeed



Triple infeed



Note:
I_{nc} behaves like I_{cw}
$I_{cw} >= I_{k''}$

Selection and dimensioning of the main busbar system

Calculation of heat loss in busbars

The heat loss of busbars can be calculated using the following equation, provided the AC current resistance is known:

$$\mathbf{P_V = \frac{I_B^2 \cdot r \cdot l}{1000}}$$

P_V [W] heat loss

I_B [A] operating current

r [mΩ/m] AC or DC current resistance of busbar

l [m] length of busbar which I_B flows through

In order to calculate the heat loss in accordance with the above formula, in individual cases, it can be assumed that the rated current of a circuit is known. As an alternative, the "operating currents" of the busbar sections and the corresponding length of the conductor can be used.

By contrast, the resistance of conductor systems – particularly the AC current resistance of busbar arrangements – cannot simply be taken from a document or determined yourself.

For this reason, and in order to obtain comparable results when determining heat losses, the table shows the resistance values in mΩ/m for the most common cross-sections of copper busbars.

Table 24: AC current resistance of busbars made from E-Cu

Dimensions[1]	Resistance per 1 m of busbar system in mΩ/m							
	I 1 main conductor		III 3 main conductors		II II II 3 x 2 main conductors		III III III 3 x 3 main conductors	
mm	**r_{GS}**[1] (65 °C)	**r_{WS}**[2] (65 °C)	**r_{GS}**[1] (65 °C)	**r_{WS}**[2] (65 °C)	**r_{GS}**[1] (65 °C)	**r_{WS}**[2] (65 °C)	**r_{GS}**[1] (65 °C)	**r_{WS}**[2] (65 °C)
1	2	3	4	5	6	7	8	9
12 x 2	0.871	0.871	2.613	2.613	–	–	–	–
15 x 2	0.697	0.697	2.091	2.091	–	–	–	–
15 x 3	0.464	0.464	1.392	1.392	–	–	–	–
20 x 2	0.523	0.523	1.569	1.569	–	–	–	–
20 x 3	0.348	0.348	1.044	1.044	–	–	–	–
20 x 5	0.209	0.209	0.627	0.627	–	–	–	–
20 x 10	0.105	0.106	0.315	0.318	0.158	0.160	–	–
25 x 3	0.279	0.279	0.837	0.837	0.419	0.419	–	–
25 x 5	0.167	0.167	0.501	0.501	0.251	0.254	–	–
30 x 3	0.348	0.348	1.044	1.044	0.522	0.527	–	–
30 x 5	0.139	0.140	0.417	0.421	0.209	0.211	–	–
30 x 10	0.070	0.071	0.210	0.214	0.105	0.109	–	–
40 x 3	0.174	0.174	0.522	0.522	0.261	0.266	–	–
40 x 5	0.105	0.106	0.315	0.318	0.158	0.163	–	–
40 x 10	0.052	0.054	0.156	0.162	0.078	0.084	0.052	0.061
50 x 5	0.084	0.086	0.252	0.257	0.126	0.132	0.084	0.092
60 x 5	0.070	0.071	0.210	0.214	0.105	0.112	0.070	0.079
60 x 10	0.035	0.037	0.105	0.112	0.053	0.062	0.035	0.047
80 x 5	0.052	0.054	0.156	0.162	0.078	0.087	0.052	0.062
80 x 10	0.026	0.029	0.078	0.087	0.039	0.049	0.026	0.039
100 x 5	0.042	0.045	0.126	0.134	0.063	0.072	0.042	0.053
100 x 10	0.021	0.024	0.063	0.072	0.032	0.042	0.021	0.033
120 x 10	0.017	0.020	0.051	0.060	0.026	0.036	0.017	0.028

[1] **r_{GS}** DC current resistance of busbar system in mΩ/m
[2] **r_{WS}** AC current resistance of busbar system in mΩ/m

The resistance values shown in the table are based on an assumed average busbar temperature of 65 °C (ambient temperature + self-heating) and therefore on a specific resistance of:

$$\boldsymbol{\rho}\ \mathbf{(65°C)\ = 20.9} \left[\frac{\mathbf{m\Omega \cdot mm^2}}{\mathbf{m}}\right]$$

Example: **r_{GS}** for 1 main conductor 12 x 2 mm

$$r_{GS} = \frac{\rho\ (65\ °C) \cdot l}{A} = \frac{20.9 \left[\frac{m\Omega \cdot mm^2}{m}\right] \cdot 1\ m}{24\ mm^2} = 0.871\ m\Omega$$

For busbar temperatures other than 65°C, the resistance may be calculated as follows:

Positive temperature deviation
$r_{(x)} = r_{(65\ °C)} \cdot (1 + \alpha \cdot \Delta\theta)$

Negative temperature deviation
$r_{(x)} = r_{(65\ °C)} \cdot (1 - \alpha \cdot \Delta\theta)$

$r_{(x)}$ [mΩ/m] resistance at any chosen temperature

α $\left[\frac{1}{K}\right]$ Temperature coefficient (for Cu = $0.004\frac{1}{K}$)

$\Delta\theta$ [K] Temperature difference in relation to the resistance value at 65°C

ρ $\left[\frac{m\Omega \cdot mm^2}{m}\right]$ Specific resistance

Selection and dimensioning of the main busbar system

Planning example for designing busbar systems

Table 25: Continuous currents for busbars

Made from E-Cu with square cross-section in indoor locations at 35 °C air temperature and 65 °C bar temperature, vertical position or horizontal position of the bar width.

Width x thickness mm	Cross-section mm^2	Weight[1]	Material[2]	Continuous current in A			
				AC current up to 60 Hz		DC current + AC current 16 Hz	
				Uncoated bar	Coated bar	Uncoated bar	Coated bar
12 x 2	23.5	0.209	E-Cu	108	123	108	123
15 x 2	29.5	0.262		128	148	128	148
15 x 3	44.5	0.396		162	187	162	187
20 x 2	39.5	0.351		162	189	162	189
20 x 3	59.5	0.529		204	237	204	237
20 x 5	99.1	0.882		274	319	274	320
20 x 10	199.0	1.770		427	497	428	499
25 x 3	74.5	0.663		245	287	245	287
25 x 5	124.0	1.110		327	384	327	384
30 x 3	89.5	0.796		285	337	286	337
30 x 5	149.0	1.330		379	447	380	448
30 x 10	299.0	2.660		573	676	579	683
40 x 3	119.0	1.060		366	435	367	436
40 x 5	199.0	1.770		482	573	484	576
40 x 10	399.0	3.550		715	850	728	865
50 x 5	249.0	2.220		583	697	588	703
50 x 10	499.0	4.440		852	1020	875	1050
60 x 5	299.0	2.660		688	826	696	836
60 x 10	599.0	5.330		985	1180	1020	1230
80 x 5	399.0	3.550		885	1070	902	1090
80 x 10	799.0	7.110		1240	1500	1310	1590
100 x 10	999.0	8.890		1490	1810	1600	1940

[1] Calculated with a density of 8.9 kg/dm^3
[2] Reference basis for the continuous current levels (figures taken from DIN 43 671)

Scenario:

Network: TN-C, 230/400 V, 50 Hz

U_i = 400 V

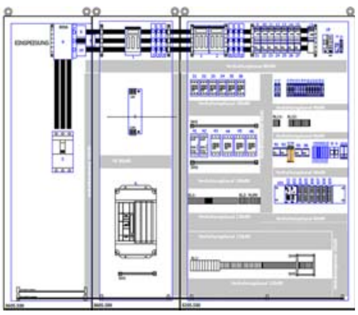
U_{imp} = 4 kV

I_n = 500 A

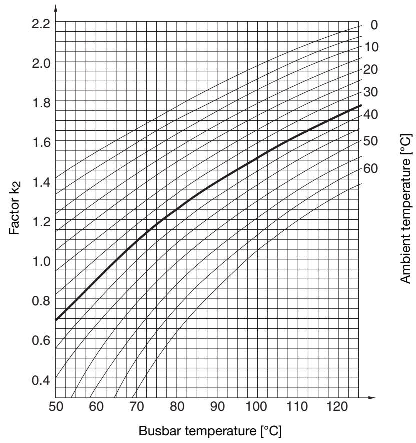
T_u max = 35 °C

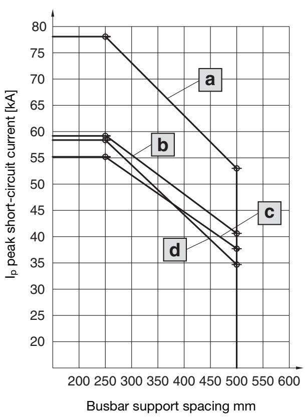
T_u max = 40 °C

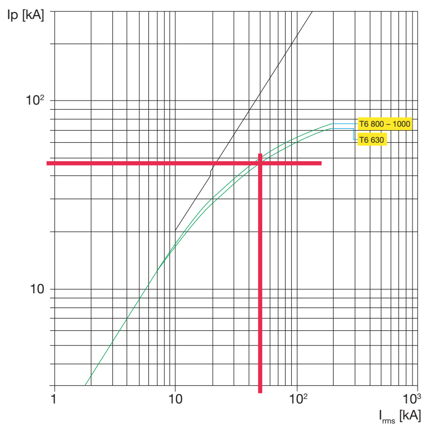
I_{cp} = 50 kA



Correction factor diagram to DIN 43 671







VX25 Ri4Power

General remarks and recommendations

Making busbar connections and connections to copper busbars

When making connections to busbar systems or interconnecting copper busbar systems, extra care should be taken when working on contact points.

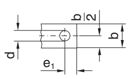
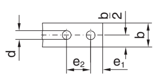
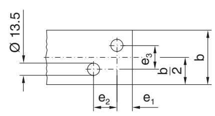
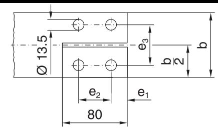
The copper components supplied by Rittal may be used directly. It is important to check that the copper components do not have any contamination caused by dust, heavy oxidation or contaminants such as coolant residues before installing in the switchgear. If there is contamination, the component or contact point must be cleaned.

To clean contact points and remove oxidation or mechanical contamination, we recommend use of a nonwoven fabric or similar. In the case of contamination from coolants or similar, an alcohol-based detergent should be used. All screw connections of connection points should be tightened with the requisite torque. Information on the requisite torques may be taken from the valid VX25 Ri4Power assembly instructions. If no additional information is provided by Rittal regarding the installation of third-party devices, the manufacturers' specifications should be observed.

Connection of busbars to DIN 43 673

Busbars should be connected in accordance with DIN 43 673. Alternative busbar connections may be made, provided they are type-tested. All connections within the VX25 Ri4Power system are confirmed by type testing or design verification tests and therefore comply with the standard specifications to IEC 61 439-1.

Drilling patterns and drilled holes

Busbar widths mm		12 to 50		25 to 60			60			80 to 100		
Form[1]		1		2			3			4		
Drilled holes in the bar ends (drilling pattern)												
	Nominal width b	d	e_1	d	e_1	e_2	e_1	e_2	e_3	e_1	e_2	e_3
Hole size	**12**	5.5	6	–	–	–	–	–	–	–	–	–
	15	6.6	7.5	–	–	–	–	–	–	–	–	–
	20	9.0	10	–	–	–	–	–	–	–	–	–
	25	11	12.5	11	12.5	30	–	–	–	–	–	–
	30	11	15	11	15	30	–	–	–	–	–	–
	40	13.5	20	13.5	20	40	–	–	–	–	–	–
	50	13.5	25	13.5	20	40	–	–	–	–	–	–
	60	–	–	13.5	20	40	17	26	26	–	–	–
	80	–	–	–	–	–	–	–	–	20	40	40
	100	–	–	–	–	–	–	–	–	20	40	50

Permissible deviations for hole-centre distances ± 0.3 mm

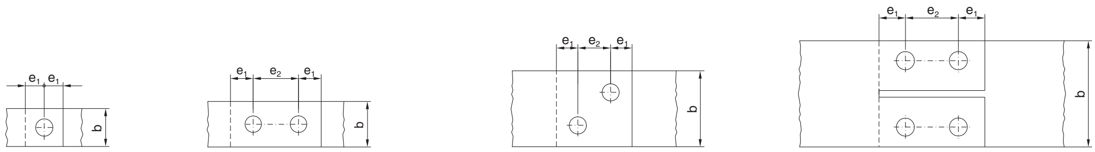
[1] Form designations 1 – 4 match DIN 46 206, part 2 – Flat-type screw terminal

VX25 Ri4Power

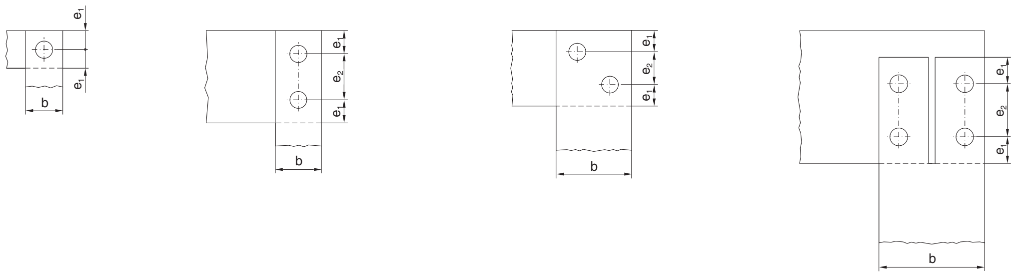
General remarks and recommendations

Examples of busbar screw connections

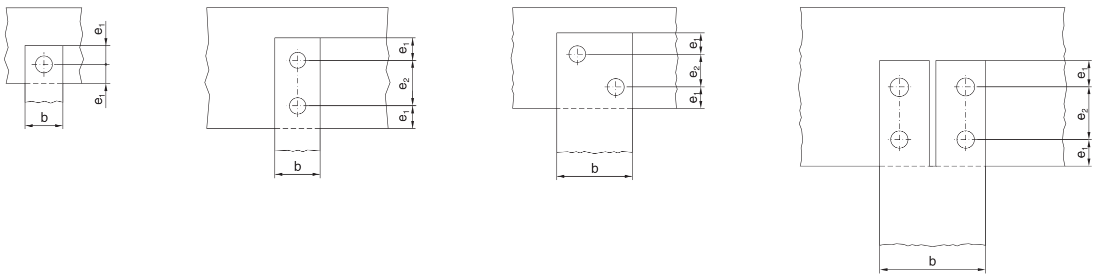
Longitudinal connections



Angular connections



T-connections



Note:
– For figures for dimensions b, d, e_1 and e_2 refer to table "Drilling patterns and drilled holes"
– Slots are permissible at one end of the bar or at the end of a bar stack

Lubricant **Thread and head lubricated**		**Oil or grease**	**Based on MoS_2**
Recommended tightening torque N · m with thread	M4 M5 M6	1.5 2.5 4.5	2 3 5.5
	M8 M10 M12	10 20 40	15 30 60
	M16	80	120

Choice of internal connections

The correct dimensioning and engagement of the connections is particularly important for correct functioning of the switchgear assembly. The switchgear manufacturer must follow the original manufacturer's specifications. Installation and assembly must always be carried out in compliance with the assembly instructions. As a general rule, the torques and dimensions specified in the assembly instructions for the VX25 Ri4Power system should be observed. If there are no special instructions on the installation or connection of a device given in the VX25 Ri4Power assembly instructions, the device manufacturer's assembly instructions must be observed.

If insulated cables are used to connect the main circuits, these should be chosen for temperature resistance up to 105 °C. This results from an ambient temperature of 35 °C and a maximum admissible overtemperature of 70 K at the device connections of the equipment.

VX25 Ri4Power

General remarks and recommendations

Air circuit-breakers (ACB)

For air circuit-breakers, the choice of connection material is limited to copper bar version "half hard (HB)".
The use of laminated copper bars to connect ACBs within the VX25 Ri4Power system is not admissible.

The dimensioning of the busbar cross-sections and the number of busbars to be used may be taken from tables 42 – 49, see page 132 – 147. However, Rittal recommends that you use the latest version of its Power Engineering software, which automatically calculates the corresponding cross-sections for all admissible switches.

Moulded-case circuit-breakers (MCCB)

For connecting MCCBs, the information given in tables 50 – 57, see page 148 – 170 should be used as the minimum cross-section. The prescribed conductor types may be used, such as round conductors, laminated copper bars or solid copper bars, as per the switchgear manufacturer's specifications.
Furthermore, for devices greater than 100 A and for busbar connection, conductor materials should be designed with a 105 °C temperature-resistant insulation.

When using 80% current load of the device current, the connected conductors must be designed for the maximum current of the devices. For devices below 100 A rated current, conductors with a temperature resistance of 90 °C may be used.

NH fuse-switch disconnectors

The connection cross-sections should be dimensioned in accordance with the device size and the fuse insert used, as per the following table:

Table 26: Admissible rated current I_{nc} and connection cross-section for NH fuse-switch disconnectors

Size	Max. device rated current I_n	Rated current of fuse I_{n1}	Max. rated operating current I_{nc}	Minimum connection cross-section
Size 00	160 A	up to 20 A	$= I_{n1}$	2.5 mm^2
Size 00	160 A	25 A	$= I_{n1}$	4 mm^2
Size 00	160 A	35 A	$= I_{n1}$	10 mm^2
Size 00	160 A	50 A	$= I_{n1}$	10 mm^2
Size 00	160 A	63 A	$= I_{n1}$	16 mm^2
Size 00	160 A	80 A	$= I_{n1}$	25 mm^2
Size 00	160 A	100 A	$= I_{n1}$	35 mm^2
Size 00	160 A	125 A	$= I_{n1}$	50 mm^2
Size 00	160 A	160 A	$= I_{n1}$	70 mm^2
Size 1	250 A	160 A	$= I_{n1}$	Cf. size 00
Size 1	250 A	224 A	$= I_{n1}$	95 mm^2
Size 1	250 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	200 A	$= I_{n1}$	Cf. size 1
Size 2	400 A	224 A	$= I_{n1}$	120 mm^2
Size 2	400 A	250 A	$= I_{n1}$	120 mm^2
Size 2	400 A	315 A	$= I_{n1}$	185 mm^2
Size 2	400 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	315 A	$= I_{n1}$	Cf. size 2
Size 3	630 A	400 A	$= I_{n1}$	240 mm^2
Size 3	630 A	500 A	$= I_{n1}$	2 x 185 mm^2
Size 3	630 A	630 A	$= I_{n1}$	2 x 240 mm^2

This specification only applies to fuse inserts of the type gg/gL. For other fuse types, the specifications of the fuse manufacturers should additionally be observed.

The rated current of the fuses is used for dimensioning the cross-sections. Additionally, the next largest cable cross-section is used. From 63 A, the temperature resistance of the cables should be 105 °C.

The maximum operating current of the device should not exceed 80%. In a horizontal mounting position, the NH devices should only be used as fuse holders and must not be used as switchgear. This should be labelled e.g. with a sticker (Do not open under load).

Protection designations, operating categories

D-System
DIAZED = diametrically graduated two-piece Edison fuse

- DII fusible element has an E27 electrical thread and currents up to 25 A
- DIII fusible element has an E33 electrical thread and currents up to 63 A
- Application range RiLine

D0-System
NEOZED is a Siemens registered trademark

- D01 fuse elements have an E14 up to 16 A (with featherkey, may also be used in D02 elements)
- D02 fusible elements have an E18 electrical thread and can protect against short-circuits with currents up to 63 A
- Application range RiLine

NH system
Low-voltage high-performance fuse for line protection

- The sizes of the fuses are as follows:
  - NH 000 from 2 – 100 A
  - NH 00 from 2 – 160 A
  - NH 0 from 6 – 160 A (must no longer be used in new systems)
  - NH 1 from 16 – 250 A
  - NH 2 from 25 – 400 A
  - NH 3 from 63 – 630 A
  - NH 4 from 500 – 1000 A
  - NH 4a from 500 – 1600 A
- Application range RiLine and VX25 Ri4Power

Table 27: Operating categories of fuse inserts

Designations	
gG/gL	All-range fuse –> Overcurrent cable protection and short-circuit protection
gM	All-range fuse inserts for protecting motor circuits
aM	Back-up fuse short-circuit protection for motor circuits in circuits
gD	All-range breaking capacity with delay
gN	All-range breaking capacity without delay
aR	Back-up fuse, only short-circuit protection for semi-conductor protection, high-speed
gS	All-range fuse, semi-conductor elements, high-speed
gR	All-range fuse, semi-conductor protection high-speed, faster than gS
gTr	Transformer protection
gB	Protection for mining systems

Table 28: Colour code for fuse inserts

Electri-city	Colour
2 A	Pink
4 A	Brown
6 A	Green
10 A	Red
16 A	Grey
20 A	Blue
25 A	Yellow
35 A	Black
50 A	White
63 A	Copper
80 A	Silver
100 A	Red
125 A	Yellow
160 A	Copper
200 A	Blue

Motor-starter combinations (MSC)

Wiring of the main circuit
The cross-sections of the main circuit should always be dimensioned one cross-section step larger than that calculated on the basis of rated current. If the switchgear manufacturer requires a larger cross-section, this should be followed.
The insulation of the conductor material of the main circuits must be designed for an overtemperature of 70 K in accordance with IEC 60 947.

Wiring for auxiliary circuits
General wiring should be selected in conformity with Annex H of IEC 61 439-1. The type of wiring must withstand a maximum temperature of 60°C if the switchgear is installed an area with a maximum ambient temperature of 35°C. If the ambient temperature is higher, the insulation material must meet a higher temperature resistance.

General wiring

General wiring should be selected in conformity with Annex H of IEC 61 439-1.

VX25 Ri4Power

General remarks and recommendations

Operation and maintenance

The manufacturer of the low-voltage switchgear combination must define the required measures for installation, commissioning and maintenance of the low-voltage switchgear enclosure in writing and give these to the operator.

Notes on the use of aluminium cables

Aluminium cable on terminal SV 9650.325/9640.325

The conductor connection clamp may be used for connecting single- and multi-wire round conductors of copper or aluminium from 95 – 300 mm^2. For connecting aluminium conductors, the following work steps must be observed:

Step 1:
The surface of the aluminium conductor should be cleaned to remove any dirt and, above all, the oxide layer.

Step 2:
Immediately after removing the oxide layer, the clean conductor surface is coated using an acid- and alkaline-free grease such as technical vaseline. This prevents the formation of a new layer of oxide.

Step 3:
Immediately after preparing the conductor, it should be connected to the conductor connection clamp using the rated torque.

Step 4:
One day later, check the connected conductors to ensure that they are firmly seated, and if necessary, check the torque.

Step 5:
The connection points must be monitored with recurrent inspections of the entire switchgear. It is expedient, for example, to use thermographic images or resistance measurements for monitoring purposes.

Switchgear installation types

The switchgear should always be installed horizontally.

Rittal switchgear may be positioned back to back or directly against the wall without derating the busbar systems and switchgear. This is based on the tests and test results.
All switchgear was insulated at the rear, as well as the side panels during testing.

This applies to the installation of switchgear in the middle of the room, back against the wall, side panels without convection, and the option of baying other enclosure panels.

Operating and ambient conditions

The siting conditions for VX25 Ri4Power systems are identical for all field types. Any requirements which deviate from this should be agreed with the product management team.

Operating and ambient conditions	Ambient temperature	Short-term peak	+40 °C	EN 61 439-1 EN 61 439-2
		Maximum on a 24 h average	+35 °C	
		Low	-5 °C	
	Atmospheric conditions	Normal climatic stress		EN 61 439-1 EN 61 439-2
		Relative humidity	50% at 40 °C 90% at 20 °C (without dew/condensation due to temperature fluctuations)	
			Operation up to 2000 m above sea level	

Additional field-specific technical data for the tested field types is listed in detail on the following pages. This data represents the maximum, tested figures.

For optimum adaptation of customer requirements to the possible system assemblies, we recommend use of the latest version of the Rittal Power Engineering software.

Conductor cross-section in relation to short-circuit withstand strength (unprotected active conductors)

Standard reference IEC 61 439-1

Active conductors in switchgear assemblies that are not protected by short-circuit protection devices (see IEC 61 439, chapter 8.6.4) must be selected and laid throughout their entire route in the switchgear assembly to prevent the likelihood of short-circuits between the phase conductors or between the phase conductors and earthed parts.

Conductors, selected and installed according to the table below, with an SCPD (short-circuit protection device) on the load side, must not exceed a length of 3 m. The conductor cross-section should be dimensioned such that, firstly, the rated current can be carried and secondly, if there is a short-circuit, the conductor will not overheat inadmissibly until the downstream protection device is deactivated (see also VDE 0298, part 4: 2003- 08).

Table 29: Conductor selection and laying conditions (IEC 61 439, chapter 8.6.4, table 4)

Type of conductor	Requirements
Uncoated conductor or single-wire conductor with basic insulation e.g. to IEC 60 227-3	Mutual contact or contact with conductive parts must be prevented, e.g. via the use of spacer supports.
Single-wire conductors with basic insulation and an admissible operating temperature of the conductor of at least 90 °C, e.g. cables to IEC 60 245-3 or heat-resistant thermoplastic (PVC)-insulated cables to IEC 60 227-3	Mutual contact or contact with conductive parts is admissible without the external influence of pressure. Contact with sharp edges is to be avoided. These conductors must only be loaded in such a way that an operating temperature of 80% of the maximum admissible operating temperature on the conductor is not exceeded.
Conductors with basic insulation, e.g. cables to IEC 60 227-3 with an additional second insulation, such as cables with an individual shrink sleeve or cables laid individually in plastic tubes	No additional requirements
Conductors insulated with a material of very high mechanical strength, such as ethylene-tetrafluoroethylene (ETFE) insulation, or double-insulated conductors with a reinforced outer coating, dimensioned for use up to 3 kV, e.g. cables to IEC 60 502	
Single- or multi-wire light plastic-sheathed cables, e.g. cables to IEC 60 245-4 or IEC 60 227-4	

Cable routing or cable entry

The corresponding preparations stipulated by or agreed with the manufacturer of the low-voltage switchgear assembly should be made with regard to cable entry and attachment.

The requisite bending radii of the cables used should also be taken into account. Adequate cable clamp rails should be provided to secure them. Adequate quantities of terminal connections should be provided for all cables.

General remarks and recommendations

Neutral conductors – Requirements

General
Dimensioning of the neutral conductor is described in IEC 61 439-1, chapter 8.6. The following minimum requirements apply to the neutral conductor in 3-phase circuits.

- In circuits with a phase conductor cross-section up to and including 16 mm^2, the neutral conductor must correspond to 100% of the corresponding phase conductors.
- In circuits with a phase conductor cross-section of more than 16 mm^2, the neutral conductor must correspond to 50% of the corresponding phase conductors, but at least 16 mm^2.

The current in the neutral conductor is assumed to be no more than 50% of a phase conductor current. The dimensioning of the neutral conductor should be agreed in advance with the end client.

Explanation of the neutral conductor
In systems that simultaneously have ohmic, capacitive and inductive loads on the phase conductors, more than 100% load of the neutral conductor is possible.

Neutral conductor in the main busbar system
Assembly of the main busbar system in a 4-pole version is possible.

If the neutral conductor is to be routed separately, this can be achieved with the busbars in the dimensions 50 x 10 or 30 x 10. Further details can be found in the field-specific assembly instructions.

The chosen power supply net form (TN-C, TN-CS, ...), see page 99, defines the design of the neutral conductor.

ACB air circuit-breaker sections
When using a switched neutral conductor or a 4th pole routed with the phase conductors, this is assembled in exactly the same way as a regular 4-pole ACB section. If the fourth pole is not switched, the neutral conductor rises parallel to the phases via stacking insulators.

If the anticipated current in the neutral conductor is greater than 50%, the neutral conductor should be dimensioned in the phase conductor cross-section of the connection kit. If the neutral conductor current is less than 50%, the cross-section may be halved.
If the neutral conductor is not switched, the cross section may be designed to IEC 61 439-1.

NH slimline fuse-switch disconnector section
When using 4-pole NH slimline fuse-switch disconnectors from ABB (SlimLine) or Jean Müller (Sasil), the neutral conductor should be routed in the main conductor cross-section. The busbar support is unable to accommodate different busbar designs, compared with the phase conductors. If the neutral conductor is routed in the cable outgoing feeder section, this should be designed in accordance with standard IEC 61 439-2.

Neutral conductors for switchgear
Neutral conductors for 4-pole switchgear that have not already been described in this chapter must be dimensioned and connected in accordance with the original device manufacturer's specifications. If there is no clear definition given in the original device manufacturer's specifications, the neutral conductor should be dimensioned in conformity with the general rules of this chapter and Annex H of IEC 61 439-1.

General remarks and recommendations

Notes on the laying and design of N, PE and PEN conductors

N, PE and PEN conductors are to be dimensioned in accordance with IEC 61 439.

For dimensioning of the minimum cross-section of the PE conductor or PEN conductor for the PE conductor function, please refer to chapter 8.4.3. and Annex B.

The PE/PEN system solutions offered by Rittal have been tested as follows:

Table 30: Selection of PE/PEN conductors on the basis of rated short-term withstand current

Busbar cross-section	Test values	For rated short-term withstand current I_{cw} of the main busbar system
E-Cu 30 x 5 mm	25 kA, 1 sec.	41 kA, 1 sec.
E-Cu 30 x 10 mm	30 kA, 1 sec.	50 kA, 1 sec.
E-Cu 40 x 10 mm	42 kA, 1 sec.	70 kA, 1 sec.
E-Cu 80 x 10 mm	60 kA, 1 sec.	100 kA, 1 sec.

Additionally, when dimensioning the PEN conductor, it should be noted that the minimum cross-section must also satisfy the requirement for the N function.

Dimensioning of the neutral conductor or the neutral conductor function of the PEN conductor depends on the anticipated load and should be agreed between the user and the manufacturer. If no specifications have been made by the user in this connection, the following regulations should be used for the minimum cross-section in accordance with IEC 61 439-1/ DIN EN 61 439-1, chapter 8.6.1.

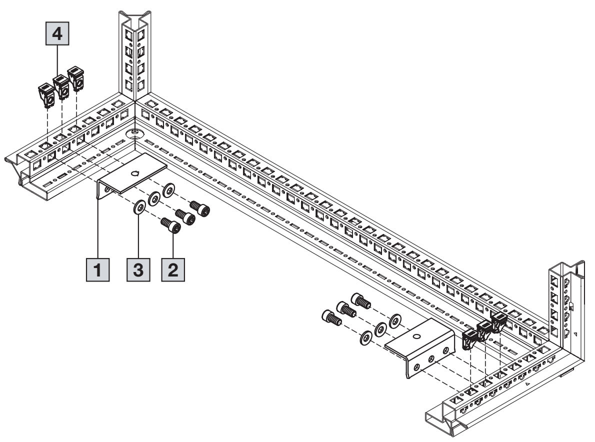
In circuits with a phase conductor cross-section up to and including 16 mm^2, the neutral conductor should be designed with the same cross-section (100 % of the phase conductor cross-section).

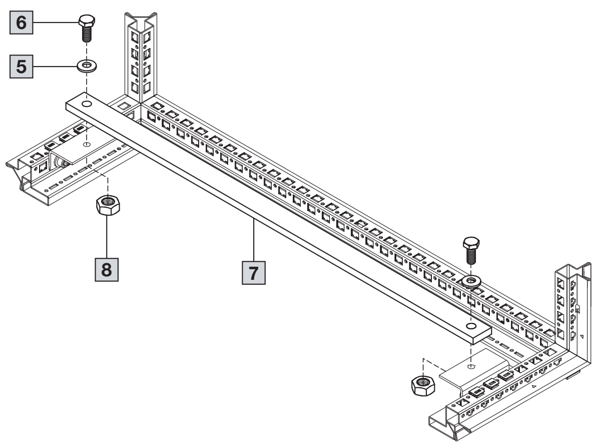
In circuits with a phase conductor cross-section of more than 16 mm^2, the neutral conductor should be designed with half the cross-section (50% of the phase conductor cross-section), but with a minimum cross-section of 16 mm^2.

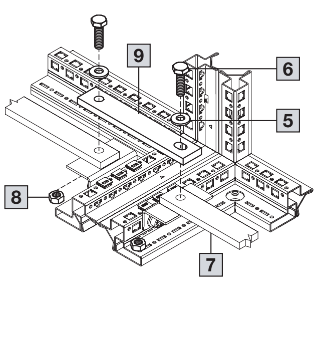
These regulations should be applied for all internal conductors in a switchgear.

However, they only apply under the assumption that the current of the neutral conductor is no more than 50% of the phase conductor current. For higher currents on the neutral conductor or high harmonic contents, the cross-sections should be defined correspondingly higher.

The PE, PEN and N conductors should be fitted in accordance with the position shown in the VX25 Ri4Power assembly instructions.







1 Angle bracket PE/PEN 9686.350
2 Hex screw M8
3 Spring washer A8.4
4 Captive nut M8 4165.500
5 Spring washer A10.5
6 Hex screw M10
7 PE/PEN busbar 9686.5XX
30 x 5; 30 x 10; 40 x 10; 80 x 10
8 Hex nut M10

For baying of enclosure system VX25:

9 Baying bracket PE/PEN 9686.529/.539/.549/.589

Dimensioning of the PE with the aid of the calculation given in Appendix B (normative)

Procedure for calculating the cross-section of PE conductors with regard to thermal stresses from short-term currents.

The cross-section of PE conductors that must withstand the thermal stresses of currents for a duration of 0.2 s to 5 s is calculated using the following equation:

$$S_p = \frac{\sqrt{I^2\, t}}{k}$$

whereby

S_p is the cross-section in mm^2

I is the value of the short-circuit AC current (root-mean-square value) for a malfunction with negligible impedance that can flow through the short-circuit device, in amperes

t is the cut-out time of the disconnecting device in seconds[1)]

k is the factor depending on the material of the PE conductor, the insulation and other parts, as well as on the starting and final temperature; see table opposite

[1)] The current-limiting effect of the circuit impedances and the current-limiting properties of the protective device (I^2t) should be taken into account.

Example: I_{CW} = 35 kA

$$S_p = \frac{\sqrt{35.000^2 \cdot 1\ \text{sec}}}{176} = 199\ mm^2$$

–> e.g. 20 x 10 = 200 mm²

Example: I_{CC} = 50 kA

$$S_p = \frac{\sqrt{50.000^2 \cdot 0.2\ \text{sec}}}{176} = 127\ mm^2$$

–> e.g. 30 x 5 = 150 mm²

For further details see IEC 60 364-5-54.

Values for factor k for insulated PE conductors not contained in cables, or for uncoated PE conductors where in contact with cable covers

Table 31: Factor k depending on the conductor material and insulating material

	Insulation of the PE conductor or cable cover		
	Thermoplastic (PVC)	VPE EPR Uncoated conductors	Butyl rubber
Final temperature of conductor	160 °C	250 °C	220 °C
Conductor material		Factor k	
Copper	143	176	166
Aluminium	95	116	110
Steel	52	64	60

The starting temperature of the conductor is assumed to be 30 °C.

General remarks and recommendations

I_k'' values for transformers

Table 32: Rated currents and short-circuit currents of standard transformers

Rated voltage U_N = 400 V	400 V		
Short-circuit voltage U_k		4%[1]	6%[2]
Power consumption S_{NT} [kVA]	Rated current I_N [A]	Short-circuit current I_k'' [3] [kA]	
50	72	1.89	–
63	91	2.48	1.65
100	144	3.93	2.62
125	180	4.92	3.28
160	231	6.29	4.20
200	289	7.87	5.24
250	361	9.83	6.56
315	455	12.39	8.26
400	577	15.73	10.49
500	722	19.67	13.11
630	909	24.78	16.52
800	1155	–	20.98
1000	1443	–	26.22
1250	1804	–	32.78
1600	2309	–	41.95
2000	2887	–	52.44
2500	3608	–	65.55

[1] U_k = 4% standardised to DIN 42 503 for S_{NT} = 50 ... 630 kVA
[2] U_k = 6% standardised to DIN 42 511 for S_{NT} = 100 ... 1600 kVA
[3] I_k'' = Initial symmetrical short-circuit current of transformer when connecting to a mains supply with unlimited short-circuit rating

Deviating service conditions

**Table 33: Recommendation for deviations from the usual operating conditions.
Factor k_5 to reduce the load at altitudes of 1000 m or above (based on DIN 43 671)**

Height above mean sea level mm	Factor k_5	
	Indoors	Open-air[1]
1000	1.00	0.98
2000	0.99	0.94
3000	0.96	0.89
4000	0.90	0.83

[1] Higher figures if geographical latitude above 60° and/or particularly dusty air

VX25 Ri4Power

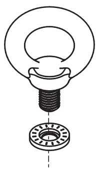
General remarks and recommendations

Transport units and weights

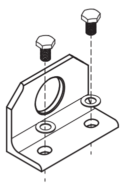
Details may be found in the VX25 load brochure (available to download at www.rittal.com).

Transportation by crane

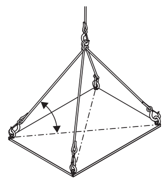
All VX25 enclosures are suitable for transporting by crane, either as free-standing enclosures or as bayed suites.



Eyebolt 4568.000
For transporting enclosures by crane (based on DIN 580).



Combination angle 4540.000
Combination angles must be used when transporting bayed enclosures by crane, to ensure the optimum distribution of tensile forces.



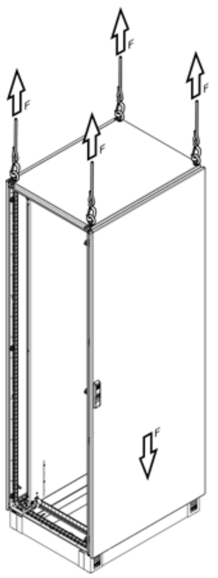
Cable pull angle

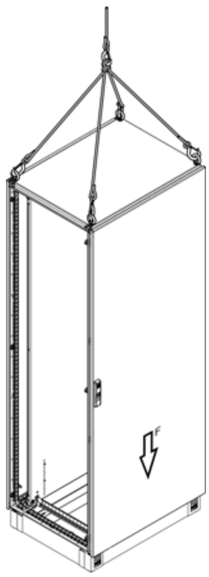
With eyebolts
Individual enclosures are safely transported using the eyebolts.
For symmetrical loads, the following maximum permissible overall loads apply:
F ≙ for 90° cable pull angle 13600 N
F ≙ for 60° cable pull angle 6400 N
F ≙ for 45° cable pull angle 4800 N

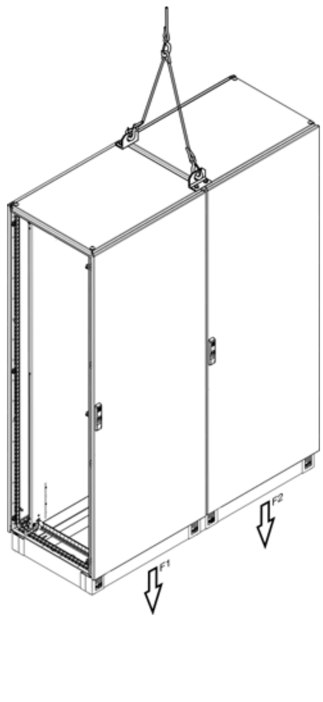
With combination angle

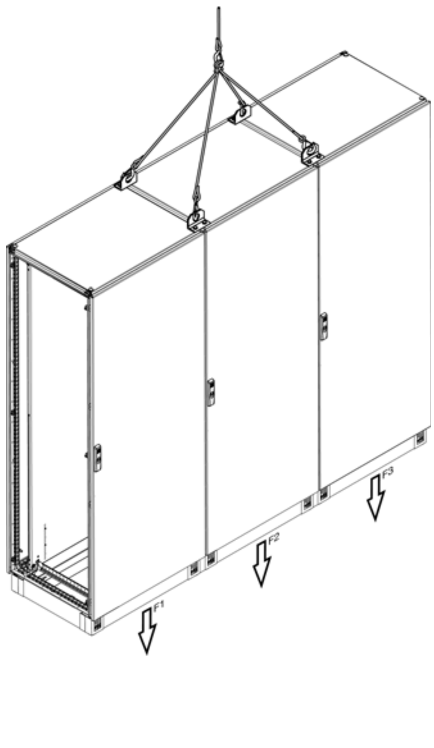
For the enclosure combination with internal baying brackets, 8617.500 (3 per vertical section) and combination angles shown here, the load capacity with a cable pull angle of 60° is as follows:
F1 = 7000 N
F2 = 7000 N

For the enclosure combination with internal baying brackets, 8617.500 (3 per vertical section) and combination angles shown here, the load capacity with a cable pull angle of 60° is as follows:
F1 = 7000 N
F2 = 14000 N
F3 = 7000 N









VX25 Ri4Power

General remarks and recommendations

Mounting of additional contact hazard protection covers

If the requirements for a low-voltage switchgear assembly mean that additional contact hazard protection covers are necessary, the following points should be borne in mind during installation:

Additional covers must not interrupt or significantly alter air routing.

If such covers are installed horizontally, care should be taken to ensure that vent openings are provided in the cover plates and that their total area is approx. 10% larger than the area of the vent openings in the compartment divider. If no compartment dividers are used, the total area of the vent openings must be not less than 10% of the total cross-section of the enclosure.

With all covers it is important to ensure that convection can still take place and that no sealed spaces are created. Covers must not seal vent openings which are provided for ventilation purposes on components from the modular VX25 Ri4Power system.

If forced ventilation is used, the permeable area on all covers must be 10% larger than the area of the air outlet opening.

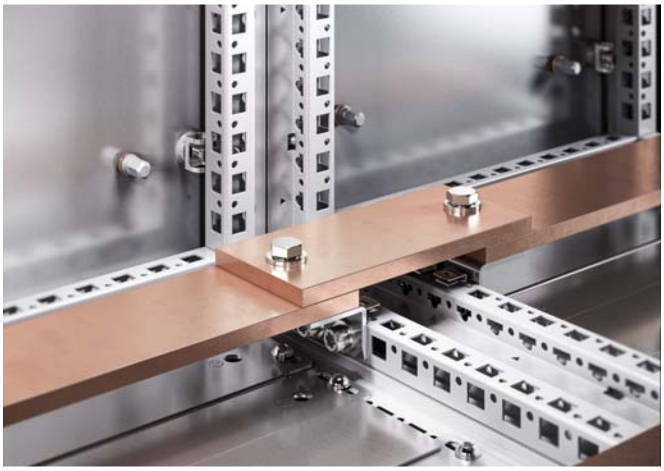
The central earth point (CEP) in TN-S networks

The CEP should be provided in the main low-voltage distributor. The connection should be a solid copper bar with at least the cross-section of the PEN/N conductor. If possible, the connection should be positioned in the centre of the main low-voltage distributor.

No other connections should exist between the PEN and the N, and also no connection between the NE and P conductor in the entire downstream wiring. The CEP should be clearly labelled. We recommend voltage and current monitoring in the CEP connection for this network configuration.

PE conductor connection and current carrying capacity of PE conductor connections

The automatic contacting system of the VX25 ensures a conducting connection between all panel elements and the enclosure frame. The results of our tests and measurements confirm that the connections posses a contact resistance of less than 0.1 Ω, as demanded in IEC/DIN EN 62 208.
With regard to the inclusion of the door in the protection measures for “Protection in case of indirect contact” we recommend connection of a separate earth conductor to the door, as a permanent conducting connection cannot be guaranteed (paint, oil, contamination, etc.). The designer must determine whether or not the automatic contacting is sufficient for the earthing system.



Internal separation of switchgear assemblies

Internal separation of a switchgear assembly increases the level of safety for individuals and the system itself.

The areas to be separated are the busbar compartments, function units and connection areas. The degree of internal separation should be agreed between the manufacturer of the switchgear assembly and the user.

Meaning

a Enclosure
b Internal separation
c Main or distribution busbar
d Function units
e External connections

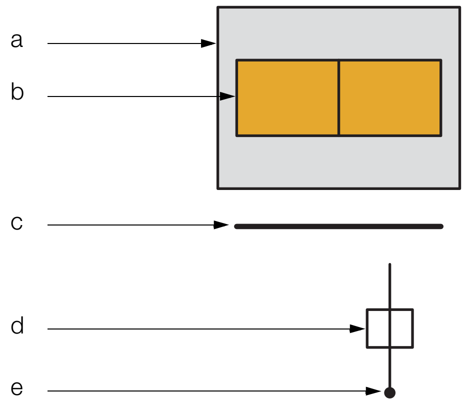
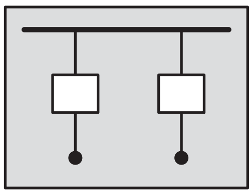
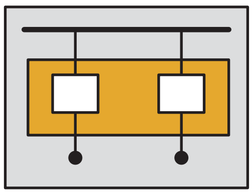
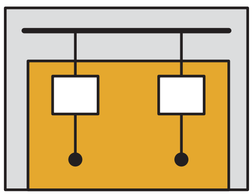
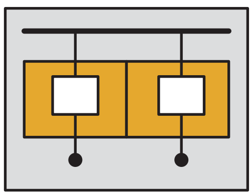
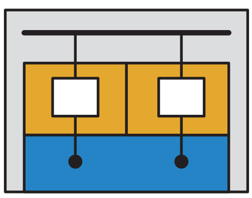
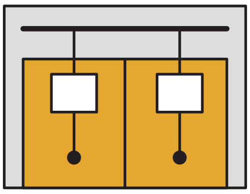
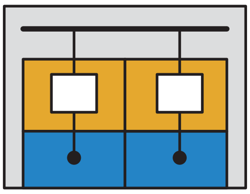


Table 34: Forms of internal separation

Standard IEC/EN 61 439-2 defines the following Forms of internal separation (cf. section 8.101, EN 61 439-2)

Form 1 No internal separation There is no separation between the individual areas.	
Form 2a Separation between the busbars and function units, but no separation between the connections and busbars.	
Form 2b Separation between the busbars and function units, and separation between the connections and busbars.	
Form 3a Separation between the busbars and function units and separation between the individual function units and separation between the connections for conductors fed in from the outside and the function units, but not between the connections themselves. However, with Form 3a there is no separation between the connections and busbars.	
Form 3b Separation between the busbars and function units and separation between the individual function units and separation between the connections for conductors fed in from the outside and the function units, but not between the connections themselves. With Form 3b there is separation between the connections and busbars.	

General remarks and recommendations

Form 4a Compartmentalisation between the busbars and function units and compartmentalisation between the individual function units and compartmentalisation between the connections for conductors fed in from the outside that are assigned to a function unit, and the connections of all other function units, as well as the busbars. With Form 4a, however, the connections and the function unit are in one compartment.	
Form 4b Separation between the busbars and function units and separation between the individual function units and separation between the connections for conductors fed in from the outside that are assigned to a function unit, and the connections of all other function units, as well as the busbars. With Form 4b, however, the connections and the function unit are likewise separated.	

Explanation:
Internal separation is met via compliance with protection category IPXXB.
For protection against the ingress of solid foreign bodies, protection category IP2X is a minimum requirement.

General remarks and recommendations

Admissible heat losses within compartments

For verifying the admissibility of individual mounting parts in compartments with and without distribution busbar systems, the following table may be used. To this end, the sum total of actual heat losses of the devices and wiring must be calculated.

Configuration without additional climate control or cooling is admissible, provided the calculated value is <= the admissible value for the compartment, and the sum total of heat losses arising in this compartment is <= the maximum total heat loss. The calculation should be enclosed with the plant documentation.

Table 35: Heat loss table for compartment with distribution busbar

Compartment width mm	Compartment height mm	Compartment depth mm	Max. heat loss specification of switchgear in W (uninstalled heat loss)		Comments
			IP2X	IP54	
400/600/800	150	401/425/600/800	33	20	–
400/600/800	200	401/425/600/800	33	27	–
400/600/800	300	401/425/600/800	76	76	–
400/600/800	400	401/425/600/800	76	76	–
400/600/800	600	401/425/600/800	193	151	–
400/600/800	800	401/425/600/800	193	151	–
400/600/800	1000	401/425/600/800	193	151	–
400/600/800	1600	401/425/600/800	193	151	–
400/600/800	Section height 2000	401/425/600/800	218	218	Max. total heat loss of section
400/600/800	Section height 2200	401/425/600/800	245	245	Max. total heat loss of section
Mounting plates Form 1[1]	Section height 2000	–	218	218	–
	Section height 2200	–	245	245	–

[1] In Form 1 (open design without internal separation), the figure for the complete section height should always be used. This also applies if the heat loss producers are divided among several small partial mounting plates within the section.

General remarks and recommendations

Protection categories IP/ Enclosures IEC 60 529

Table 36: Positioning of the IP code

IP	Code letter	
Item 1	0 – 6	First code number for protection against contact and foreign bodies:
Item 2	0 – 8	Second code number for level of protection against water
Item 3	A – D	Additional letter
Item 3/4	H, M, S, W	Supplementary letter

Table 37: Protection against contact and foreign bodies, code number 1

Code	Equipment	Persons
X	Not given	Not given
0	Non-protected	Non-protected
1	> = 50 mm diameter	Back of the hand
2	> = 12.5 mm diameter	Safe from finger contact
3	> = 2.5 mm diameter	Tool
4	> = 1 mm diameter	Wire
5	Dust-protected	Wire
6	Dust-tight	Wire

Table 38: Level of protection against water, code number 2

Code	Equipment	Persons
X	Not given	–
0	Non-protected	–
1	Vertical drops	–
2	Drops at a 15° angle	–
3	Sprayed water	–
4	Splashed water	–
5	Water jets	–
6	Powerful water jets	–
7	Occasional submersion	–
8	Continuous submersion	–

Table 39: Additional letter, code number 3

Code	Equipment	Persons
Against access to dangerous parts with		
A	–	Back of the hand
W	–	Finger
C	–	Tool
D	–	Wire
Supplementary information specifically for		
H	High-voltage appliances	–
M	Movement during water test	–
S	Motionless during water test	–
W	Weather conditions	–

Table 40: Levels of protection against access to hazardous live parts, code number 1

Code	Definition
0	Non-protected
1	The probe, a 50 mm diameter sphere, must have adequate clearance from dangerous parts
2	The articulated test finger, 12 mm diameter, 80 mm length, must have adequate clearance from dangerous parts
3	The probe, 2.5 mm diameter, must not penetrate
4	The probe, 1.0 mm diameter, must not penetrate
5	
6	

Table 41: Levels of protection against solid bodies, code number 1

Code	Definition
0	Non-protected
1	The object probe, a sphere 50 mm in diameter, must not penetrate fully.
2	The object probe, a sphere 12.5 mm in diameter, must not penetrate fully.
3	The object probe, a sphere 2.5 mm in diameter, must not penetrate fully.
4	The object probe, a sphere 1.0 mm in diameter, must not penetrate fully.
5	Dust may ingress in non-hazardous quantities (no influence of equipment)
6	No dust may ingress

VX25 Ri4Power

Accidental arcing protection

Accidental arcing protection for human safety

The VX25 Ri4Power system meets the requirements for accidental arcing protection to IEC 61 641. The tested, permitted technical data and the approved busbar systems may be found in the current technical specifications or on our website **www.rittal.com**.

The basic requirement for compliance is the use of pressure relief flaps. Additional measures may be necessary depending on the busbar system selected and the anticipated short-circuit currents.

Built-in equipment such as indicator lights, test equipment or display devices should be covered by a viewing window.

A preventative accidental arcing protection may be operated in addition to this. The preventative measures limit the potential for an accidental arc occurring. Dropped screws or tools cannot strike active conductors and trigger an accidental arc. In order to achieve the preventative measures for avoiding accidental arcs, the busbar systems used should be covered as far as possible using the accessory materials from the VX25 Ri4Power modular system.

For further information, please contact our system advisors for power distribution.

Protection from arcing for persons and equipment

What exactly is arcing?

In electrical power engineering, arcing is a phenomenon whereby an arc of light is caused by ionised air, giving the impression of a direct lightning strike on a switchgear assembly. These arcs of light are unwanted in electrical systems or parts of systems, as they are generally very destructive.

If arcing occurs in a system, there are essentially three phenomena: Emissions in the form of a bang, a flash and smoke. These emissions are triggered by the plasma column (arc) created, and temperatures of around 15,000 K can occur. The bang is caused by the sudden rise in pressure occurring when the arc is created. Smoke, fire/sparks occur as metals and plastics combust in the equipment. These effects remain for as long as the arcing is able to spread unchecked in the system.

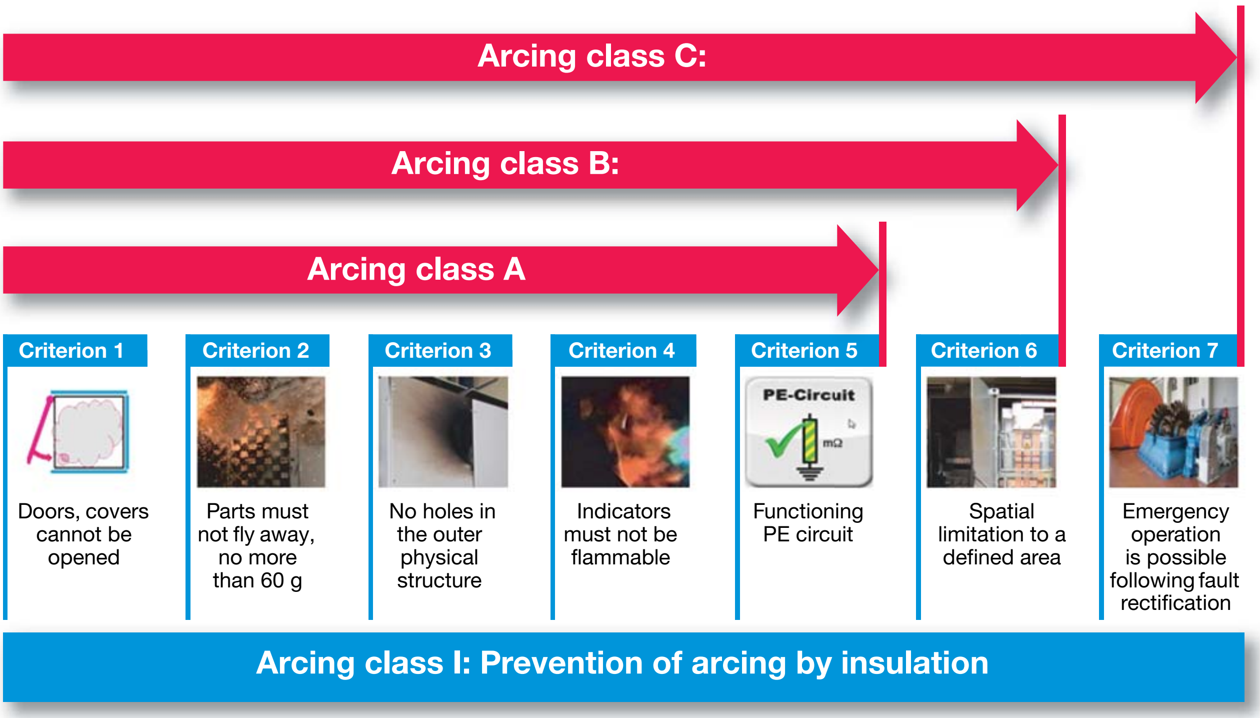
As such, an accidental arc poses a major threat to humans and equipment. To prevent expensive equipment failures, fires and personal injury, suitable protective measures should be taken at the planning and project management stage.

What causes arcing in a system?

There may be many causes, such as small animals (rodents, mice, insects etc.) gaining access to systems, tools left behind during maintenance work, defective terminal connections, or incorrectly connected conductor ends. One of the most common causes of arcing is working on live equipment, although this is not covered by IEC/TR 61641 (IEC 61 439-2, supplement 1/VDE 0660-600-2, supplement 1).

Arcing classes

IEC/TR 61641 classifies protection from arcing as follows:



VX25 Ri4Power

Accidental arcing protection

Arcing class A: Protection of persons with arc-tested zones and, where applicable, arc-proof zones

Arcing class B: Protection of persons and equipment with arc-tested zones and, where applicable, arc-proof zones

Arcing class C: Protection of persons and equipment with arc-tested zones which meet the arcing conditions with restricted operation and, where applicable, arc-proof zones

Arcing class I: Only arc-proof zones, plus fixed insulation of all conductors, no arc-testing required, but structural requirements, protection category and insulation testing must be documented

The first question you ask is: What do I want to protect from these effects?

- A: Persons positioned in front of the equipment
- B: Persons and part of the equipment.
  To be defined between the manufacturer and operator of the equipment
- C: Persons and the equipment for a high level of availability.
  To be defined between the manufacturer and operator of the equipment
- I: Entire plant, no arcing must occur in the system/higher derating

Testing of these requirements is explained in IEC/TR 61 641.

Rittal views a section of the enclosure assembly as a functional unit. In other words, arcing as defined in standard IEC/TR 61 641 for arcing classes B and C is limited to one section. For arcing class C, we recommend the make DEHNshort from DEHN as an active arcing system, on request. This therefore ensures maximum availability for the incoming panel ACTB, main busbar and distribution busbar sections. Documentation is provided by testing at various test institutes.

In the compartments, we recommend the use of arcing class I.

Rittal currently meets the basic values of arcing classes A and B for 400 V 50 kA. Other values are available on request.

How can I profitably apply this knowledge to my system?

Derivation of a tested variant: IEC/TR 61 641 states the following:

Selection of test pieces and validity of tests on similar structures (opportunities for derivation)

Arcing tests should be conducted on representative switchgear assemblies. Given the large number of designs, rated values and potential combinations of functional units and components, it is not possible to conduct arcing tests on all variants.

The response of a given variant can be verified by the test results of a comparable design. Testing should be conducted at each representative functional unit in the least favourable position in the switchgear assembly.

Switchgear assemblies and functional units that are protected by current-limiting devices should be tested with the device with the highest limiting factors (I^2t, I_{pk}) at the prospective short-circuit current and the envisaged operating voltage.

The validity of the results of testing of a functional unit with a specific switchgear assembly design may be transferred to similar designs, provided the original test was equally or more ambitious and the other functional unit can be considered equivalent to the tested unit with respect to:

- Dimensions
- Layout and strength of enclosure
- Construction method of divider panels
- Operational performance of pressure relief device, where present
- Type/design of insulation
- Surface treatment of the interior of the enclosure and the inner divider panels, e.g. non-conductive surface treatment or bare metal.

Testing conducted with a specified short-circuit current, rated operating voltage and duration also comprises:

- Identical or smaller short-circuit currents
- Identical or lower rated operating voltage and
- Identical or shorter duration

A switchgear assembly operated with direct current should also be tested with direct current. We do not recommend substituting this with an AC current test, because the arcing response and the response of all related protective devices are significantly different.

The design verfication

IEC 61 439
Documentation of the design verification

1. Basis for the design verification

- IEC 61 439 defines the requirements applicable to all low-voltage electrical switchgear assemblies and controlgear for the protection of individuals and equipment. In short, this standard states that a low-voltage switchgear assembly is a system comprised of enclosures, switchgear, busbars and climate control components.
- Compliance with the structural and response requirements of this standard should be documented by means of various individual verifications and a design verification. Individual verifications may take the form of representative sample testing, assessment, or a structured comparison with a tested low-voltage switchgear assembly.
- In order to ensure the correct layout and functioning of every finished low-voltage switchgear assembly, a routine verification should be prepared and documented when manufacturing is complete, but no later than at the time of commissioning.
- The standard divides responsibility for the manufacturing of a low-voltage switchgear assembly between the original manufacturer and the assembly manufacturer. The assembly manufacturer is the organisation which produces and markets a ready-to-use low-voltage switchgear assembly for a customer application. The original manufacturer is the organisation that originally developed a switchgear system and who is responsible for establishing the nature of verification. The original manufacturer and the assembly manufacturer may also be one and the same organisation.
- The various verifications of the design verification confirm that the components combined in a switchgear assembly operate correctly together. For this reason, certain verifications call for tests or comparisons which can only be provided by verifying the combination of different products (e.g. enclosure and busbars).
- The testing of individual devices or components, in accordance with the respective product standard, is no substitute for the verifications required for the design verification. Example: The short-circuit resistance of the PE conductor circuit is a test whose outcome will depend on the enclosure type selected and the PE conductor components used. With this test, both the enclosure and the PE conductor components are subjected to mechanical and electrical stresses which influence the test result. As such, merely testing the PE conductor components in isolation is not sufficient for verification purposes.
- The basis for the verification of heating is the specification of the respective rated operational current (I_{ng}) as max. load and the intended operational current (I_B) for each circuit as relevant information between manufacturer and user. Merely stating the rated currents of the switchgear or individual components of the switchgear assembly is not sufficient, since this may not allow for environmental influence and the influence of other components in the switchgear assembly.

2. Documentation of individual verifications

- The design verification is intended to verify that the design of a switchgear assembly or switchgear assembly system is compliant with the requirements of this series of standards (see DIN EN 61 439-1, section 10.1).

The complete and detailed documentation of the individual design verifications for the switchgear assembly system developed by the original manufacturer (including all test reports, protocols and calculations) must be prepared by the original manufacturer and archived by him in the long term.

In line with section 14.1.3 of IEC TR 61439-0, these documents are the intellectual property of the original manufacturer and are not customarily shared with third parties, unless the original manufacturer does so of his own accord.

This wording in the standard implies that the release of such detailed test reports or calculations cannot be demanded from the assembly manufacturer or user of a switchgear in order to confirm the design verification.

- In order to supply manufacturers or subsequent users of the switchgear with usable documentation of the design verification, Rittal has opted to prepare detailed documentation of the design verification. Depending on the individual verification, this summary of the design verification may contain
  - the chosen verification method
  - the confirmed measurement data
  - the corresponding test report number or report number
  - the products or systems used.

Such openness is vital if all parties involved in the process are to obtain a transparent account of the properties of a low-voltage switchgear assembly from the design verification.

The design verfication

3. Individual verifications and verification methods

The following table shows the admissible techniques for documenting the individual design verifications (taken from IEC 61 439-1, table D1, from Annex D).

No.	Features to be verified	Section	Available verification options		
			Testing [1)]	Comparison with a reference design	Assessment
1	Strength of materials and parts:	**10.2**			
	Resistance to corrosion	**10.2.2**	■	–	–
	Properties of insulating materials:	**10.2.3**			
	Thermal stability	**10.2.3.1**	■	–	–
	Resistance to abnormal heat and fire due to internal electrical effects	**10.2.3.2**	■	–	■
	Resistance to ultra-violet (UV) radiation	**10.2.4**	■	–	■
	Lifting	**10.2.5**	■	–	–
	Mechanical impact	**10.2.6**	■	–	–
	Marking	**10.2.7**	■	–	–
	Mechanical operation	**10.2.8**	■	–	–
2	Degree of protection of enclosures	**10.3**	■	–	■
3	Clearances	**10.4**	■	–	–
4	Creepage distances	**10.4**	■	–	–
5	Protection against electric shock and integrity of protective circuits:	**10.5**			
	Continuity between exposed conductive parts of the assembly and the protective circuit	**10.5.2**	■	–	–
	Short-circuit withstand strength of the protective circuit	**10.5.3**	■	■	–
6	Incorporation of switching devices and components	**10.6**	–	–	■
7	Internal electrical circuits and connections	**10.7**	–	–	■
8	Terminals for external conductors	**10.8**	–	–	■
9	Dielectric properties:	**10.9**			
	Power-frequency withstand voltage	**10.9.2**	■	–	–
	Impulse withstand voltage	**10.9.3**	■	–	■
	Housing made of insulating material	**10.9.4**	■	–	–
	External handles made of insulating material	**10.9.5**	■	–	–
	Conductors covered with insulating material for protection against electric shock	**10.9.6**	■	–	–
10	Excess temperature limit	**10.10**	■	■	■
11	Short-circuit withstand strength	**10.11**	■	■	–
12	Electromagnetic compatibility (EMC)	**10.10**	■	–	■

[1)] The test may be performed on a representative test specimen if this is permitted in the relevant test section.

4. Information included in the design verification

- The design verification documents compliance with the specifications of this standard. The design verification is comprised of 12 individual verifications. For selected individual verifications, additional sub-verifications in sub-categories may be required. If selected verifications are not required due to the application, the respective verification should, as a minimum requirement, state that verification on the basis of the standard is not required in this instance.

The design verfication

5. Below is a sample design verification

The design verification below is intended as a sample.

Design verification to	☐ DIN EN 61 439	☐ IEC 61439	Date
	☐ Part 1 – General requirements ☐ Part 2 – Power switchgear assembly ☐ Part 3 – Distribution boards up to 250 A ☐ Part 4 – Power distributors for construction sites ☐ Part 5 – Cable distributor enclosures ☐ Part 6 – Bar distributors ☐ Part 7 – Special sectors, such as marinas		Design verification number

Manufacturer of switchgear assembly:	
Address:	
Town, post code:	
E-mail:	
Description of switchgear assembly:	

Rated voltage U_n	V	
Rated operating voltage of circuits U_e	V	
Rated insulation voltage U_i	V	
Rated impulse withstand voltage U_{imp}	kV	

Rated current of switchgear assembly I_{nA}	A	
Rated current of busbar system $I_{nc\ busbar}$	A	
Rated peak withstand strength of switchgear assembly I_{pk}	kA	
Rated short-time withstand strength of switchgear assembly I_{cw}	kA	sec.
Conditional rated short-circuit current of switchgear assembly I_{cc}	kA	
Rated diversity factor of switchgear assembly RDF		
Rated frequency f_n	Hz	

Network configuration	☐ TN-C	☐ TN-S	☐ TN-C-S
	☐ IT	☐ TT	☐ Other
Degree of protection	☐ Basic protection	☐ Fault protection	☐ Total insulation
Protection category IP	☐ IPXX	☐ IPX2	☐ IP4X
	☐ IP41	☐ IP54	☐ IP55
	☐ IP65	☐ IP66	☐ IP...
Protection category IK	☐ IK 09	☐ IK 10	☐ IK ...
Type of construction	☐ Fixed installation	☐ Non-removable	☐ Fully removable
Indoor/outdoor installation	☐ Indoor	☐ Outdoor	
Stationary/mobile installation	☐ Stationary	☐ Mobile	
Usage by	☐ Qualified electrician	☐ Instructed individual	☐ Layperson
Type of short-circuit protection device	☐ Air circuit-breaker	☐ Fuse	☐ Other:

Overall dimensions	Width mm	Height mm	Depth mm
Overall weight	kg		
EMC classification	☐ Environment A	☐ Environment B	
Pollution degree	☐ 1	☐ 2	☐ 3
Special service conditions			

VX25 Ri4Power

The design verfication

Design verification		to DIN EN 61 439		Date	
Manufacturer		Type/ID number	Created by	Design verification number	
Section	**Description of verification**	**Criterion**	**Verification method**	**Product**	**Report number**
10.2.2	Resistance to corrosion	Severity __ for ________________	Test		
10.2.3.1	Thermal stability of enclosures	70 °C for a duration of 168 h with a recovery time of 96 h	Test		
10.2.3.2	Resistance of insulating materi-als to abnormal heat and fire due to internal electrical effects	960 °C for parts necessary to retain current-carrying conductors in position; 850 °C for enclosures intended for mounting in hollow walls; 650 °C for all other parts			
10.2.4	Resistance to ultra-violet (UV) radiation				
10.2.5	Lifting	Test run with the maximum mechanical load	Test		
10.2.6	Mechanical impact	IK ___	Test		
10.2.7	Marking				
10.2.8	Mechanical operation				
10.3	Degree of protection of enclosures	IP___			
10.4	Clearances	__ mm for U_{imp} __ kV	Test		
10.4	Creepage distances	__ mm for U_i __ V, VSG 3, WSG IIIa	Test		
10.5.2	Continuity between exposed conductive parts of the assem-bly and the protective circuits	< 0.1 Ohm	Test		
10.5.3	Short-circuit withstand strength of the protective circuit				
10.6	Incorporation of switching devices and components	Compliance with the structural requirement in section 8.5 for the incorporation of switching devices and components and the response requirements for EMC.	Assessment via inspection		
10.7	Internal electrical circuits and connections	Compliance with the structural requirement in section 8.6 for internal electrical circuits and connections	Assessment via inspection		
10.8	Terminals for external conductors	Compliance with the structural requirement in section 8.8 for terminals for external conductors	Assessment via inspection		
10.9.2	Power-frequency withstand voltage	Main circuits (Table 8, DIN EN 61 439-1)	Test		
		__ V AC/__ V DC for __ V < U_i ≤ __ V			
		Auxiliary circuits (Table 9, DIN EN 61 439-1)			
		__ V AC/__ V DC for __ V			
10.9.3	Impulse withstand voltage	U1 2/50 __ kV for U_{imp} __ kV			
10.9.4	Testing of housings made of insulating material	Insulation test with 1.5 times the value of the voltage specified in table 8.	Test		
10.9.5	External operating handles made of insulating material pla-ced on doors or panels	Insulation test with 1.5 times the value of the voltage specified in table 8.	Test		
10.9.6	Testing of conductors and hazardous active parts covered with insulating material for protection against electric shock	Insulation test with 1.5 times the value of the voltage specified in table 8.	Test		
10.10	Temperature-rise limits	Verification by _______			
		I_{nA} = ___ A			
10.11	Short-circuit withstand strength				
10.11	Electromagnetic compatibility (EMC)	Ambient condition ________			

The design verfication

6. Complete verification of a switchgear assembly

- Complete verification is comprised of an assembly cover sheet, the design verification and the routine verification. The assembly cover sheet includes the rating data and usage conditions of the respective switchgear and controlgear.
- For each individual verification, the design verification should include the chosen verification method, the verification criterion, and the test report number or number of another report or the calculation. This document should be submitted together with the routine verification and the other documentation. It is not necessary to forward the detailed test reports or calculations, and this information may only be inspected by a supervisory body. All documents must be kept for a minimum of 10 years from the date of the switchgear or controlgear's entry into circulation.
- The declaration of conformity (which must be prepared if the assembly is intended for use within the European Economic Area) does not constitute part of the assembly documentation. This is to be prepared by the manufacturer, but can only be requested by a supervisory authority. It is important to note that the new Low Voltage Directive entered into force in April 2016, and under this Directive, a risk assessment of the switchgear assembly must be carried out and documented. A risk assessment remains the manufacturer’s intellectual property, but any residual risks that cannot be eliminated through design measures must be listed in a safety note to the plant documentation and handed to the owner and operator of the switchgear assembly.

Rittal Automation Systems

High productivity levels and consistent optimisation of all process steps with the Rittal automated busbar machining

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 42: Rated operating currents I_{ng} for air circuit-breakers – ABB, part 1

Brand	ABB													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
Sace E 1.2	Static installation	1	630	H	630	630	630	630	400	600	600	600	600	600
Sace E 1.2	Static installation	1	800	H	800	800	800	800	400	600	600	600	600	600
Sace E 1.2	Static installation	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
Sace E 1.2	Static installation	1	1250	H	1250	1250	1250	1250	400	600	600	600	600	600
Sace E 1.2	Static installation	1	1600	H	1550	1450	1504	1400	600	600	600	600	600	600
Sace E 2.2	Static installation	2	800	H	800	800	800	800	600	600	600	600	600	600
Sace E 2.2	Static installation	2	1000	H	1000	1000	1000	1000	600	600	600	600	600	600
Sace E 2.2	Static installation	2	1250	H	1250	1250	1250	1250	600	600	600	600	600	600
Sace E 2.2	Static installation	2	1600	H	1600	1600	1600	1600	600	600	600	600	600	600
Sace E 2.2	Static installation	2	2000	H	2000	1960	2000	1940	600	600	600	600	600	600
Sace E 2.2	Static installation	2	2500	H	2200	2000	2100	1950	600	600	600	600	600	600
Sace E 4.2	Static installation	4	3200	H	2780	2360	2780	2000	800	600	600	800	600	600
Sace E 4.2	Static installation	4	4000	H	3333	2830	3333	2605	800	600	600	800	600	600
Sace E 4.2	Static installation	4	4000	V	3333	2830	3333	2605	800	600	600	800	600	600
Sace E 6.2	Static installation	6	4000	V	4000	3320	4000	2610	1000	600	800	1200	600	800
Sace E 6.2	Static installation	6	5000	V	5000	3800	5000	2950	1000	600	800	1200	600	800
Sace E 6.2	Static installation	6	6300	V	6300	3950	6300	3060	1000	600	800	1200	600	800
Sace E 1.2	Rack-mounted	1	630	H	630	630	630	630	400	600	600	600	600	600
Sace E 1.2	Rack-mounted	1	800	H	800	800	800	800	400	600	600	600	600	600
Sace E 1.2	Rack-mounted	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
Sace E 1.2	Rack-mounted	1	1250	H	1250	1250	1250	1250	400	600	600	600	600	600
Sace E 1.2	Rack-mounted	1	1600	H	1500	1400	1472	1300	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	800	H	800	800	800	800	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	1000	H	1000	1000	1000	1000	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	1250	H	1250	1250	1250	1250	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	1600	H	1600	1600	1600	1510	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	2000	H	1780	1720	1780	1600	600	600	600	600	600	600
Sace E 2.2	Rack-mounted	2	2500	H	2020	1950	2020	1814	600	600	600	600	600	600
Sace E 4.2	Rack-mounted	4	3200	H	2370	2200	2370	2110	800	600	600	800	600	600
Sace E 4.2	Rack-mounted	4	4000	H	2700	2500	2700	2400	800	600	600	800	600	600
Sace E 4.2	Rack-mounted	4	4000	V	3333	2830	3333	2605	800	600	600	800	600	600
Sace E 6.2	Rack-mounted	6	4000	V	4000	3320	4000	2610	1000	600	800	1200	600	800
Sace E 6.2	Rack-mounted	6	5000	V	5000	3800	5000	2950	1000	600	800	1200	600	800
Sace E 6.2	Rack-mounted	6	6300	V	6300	3950	6300	3060	1000	600	800	1200	600	800

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – ABB, part 2

Brand	ABB									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw} [1)]	Max. short-circuit withstand strength I_{cc} [1)]	Maximum distance from first support[2)]	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm²	mm²	mm²	mm²	mm²	mm²	kA	kA	mm	mm
Sace E 1.2	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	200	–
Sace E 1.2	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	200	–
Sace E 1.2	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	200	–
Sace E 1.2	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	200	–
Sace E 1.2	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	42	50	200	–
Sace E 2.2	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	85	250	–
Sace E 2.2	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	250	–
Sace E 2.2	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 4.2	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	150	150
Sace E 4.2	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	100	100	150	150
Sace E 4.2	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	150	150
Sace E 6.2	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	150	150
Sace E 6.2	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	8 x 60 x 10	8 x 60 x 10	8 x 60 x 10	100	100	150	150
Sace E 6.2	8 x 100 x 10	8 x 100 x 10	8 x 100 x 10	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	100	100	150	150
Sace E 1.2	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	200	–
Sace E 1.2	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	200	–
Sace E 1.2	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	200	–
Sace E 1.2	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	200	–
Sace E 1.2	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	42	50	200	–
Sace E 2.2	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	85	250	–
Sace E 2.2	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	250	–
Sace E 2.2	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 2.2	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	250	–
Sace E 4.2	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	150	150
Sace E 4.2	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	100	100	150	150
Sace E 4.2	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	150	150
Sace E 6.2	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	150	150
Sace E 6.2	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	8 x 60 x 10	8 x 60 x 10	8 x 60 x 10	100	100	150	150
Sace E 6.2	8 x 100 x 10	8 x 100 x 10	8 x 100 x 10	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	100	100	150	150

[1)] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2)] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 43: Rated operating currents I_{ng} for air circuit-breakers – Eaton, part 1

Brand	Eaton													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
IZMX 16	Static installation	1	630	H	630	630	630	630	400	600	600	600	600	600
IZMX 16	Static installation	1	800	H	800	800	800	800	400	600	600	600	600	600
IZMX 16	Static installation	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
IZMX 16	Static installation	1	1250	H	1250	1250	1250	1250	400	600	600	600	600	600
IZMX 16	Static installation	1	1600	H	1510	1400	1510	1370	400	600	600	600	600	600
IZM 40	Static installation	2	800	H	800	800	800	800	800	600	600	800	600	600
IZM 40	Static installation	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
IZM 40	Static installation	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
IZM 40	Static installation	2	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
IZM 40	Static installation	2	2000	H	2000	1900	1960	1800	800	600	600	800	600	600
IZM 40[3]	Static installation	2	2500	H	2375	1950	1990	1850	800	600	600	800	600	600
IZM 40[3]	Static installation	2	3200	H	3146	2480	2560	2080	800	600	600	800	600	600
IZM 40	Static installation	2	4000	H	3500	3100	3200	2560	800	600	600	800	600	600
MWI	Static installation	2	800	H	800	800	800	800	800	800	600	800	800	600
MWI	Static installation	2	1000	H	1000	1000	1000	1000	800	800	600	800	800	600
MWI	Static installation	2	1250	H	1250	1250	1250	1250	800	800	600	800	800	600
MWI	Static installation	2	1600	H	1600	1600	1600	1600	800	800	600	800	800	600
MWI	Static installation	2	2000	H	1900	1800	1600	1600	800	800	600	800	800	600
MWI	Static installation	2	2500	H	2375	2250	2000	2000	800	800	600	800	800	600
MWI	Static installation	2	3200	H	3200	2650	2560	2048	800	800	600	800	800	600
MWN	Static installation	1/ none	800	H	800	800	800	800	600	800	600	600	800	600
MWN	Static installation	1/ none	1000	H	1000	1000	1000	1000	600	800	600	600	800	600
MWN	Static installation	1/ none	1250	H	1250	1250	1250	1250	600	800	600	600	800	600
MWN	Static installation	1/ none	1600	H	1600	1600	1600	1600	600	800	600	600	800	600
MWN	Static installation	1/ none	2000	H	1900	1800	1600	1600	600	800	600	600	800	600
IZMX 16	Rack-mounted	1	630	H	630	630	630	630	400	600	600	600	600	600
IZMX 16	Rack-mounted	1	800	H	800	800	800	800	400	600	600	600	600	600
IZMX 16	Rack-mounted	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
IZMX 16	Rack-mounted	1	1250	H	1250	1250	1250	1250	400	600	600	600	600	600
IZMX 16	Rack-mounted	1	1600	H	1510	1450	1510	1370	400	600	600	600	600	600
IZM 40	Rack-mounted	2	800	H	800	800	800	800	800	600	600	800	600	600
IZM 40	Rack-mounted	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
IZM 40	Rack-mounted	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
IZM 40	Rack-mounted	2	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
IZM 40	Rack-mounted	2	2000	H	2000	1900	1960	1800	800	600	600	800	600	600
IZM 40[3]	Rack-mounted	2	2500	H	2375	1950	1990	1850	800	600	600	800	600	600
IZM 40[3]	Rack-mounted	2	3200	H	3146	2480	2560	2080	800	600	600	800	600	600
IZM 40	Rack-mounted	2	4000	H	3500	3100	3200	2560	800	600	600	800	600	600

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3] An adaptor from Eaton is required for connection to 4000 A (Model No. 183976 (IZMX–TH403–4000–1)).

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – Eaton, part 2

Brand	Eaton									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw}[1]	Max. short-circuit withstand strength I_{cc}[1]	Maximum distance from first support[2]	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm²	mm²	mm²	mm²	mm²	mm²	kA	kA	mm	mm
IZMX 16	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	–	–	150	–
IZMX 16	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	–	–	150	–
IZMX 16	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	–	–	150	–
IZMX 16	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	–	–	150	–
IZMX 16	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	–	–	150	–
IZM 40	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	150	150
IZM 40[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	85	150	150
IZM 40[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	85	150	150
IZM 40	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	85	85	150	150
MWI	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	–	–	–	–
MWI	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	–	–	–	–
MWI	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	–	–	–	–
MWI	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	–	–	–	–
MWI	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	–	–	–	–
MWI	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	–	–	–	–
MWI	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	–	–	–	–
MWN	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	–	–	–	–
MWN	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	–	–	–	–
MWN	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	–	–	–	–
MWN	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	–	–	–	–
MWN	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	–	–	–	–
IZMX 16	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	–	–	150	–
IZMX 16	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	–	–	150	–
IZMX 16	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	–	–	150	–
IZMX 16	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	–	–	150	–
IZMX 16	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	–	–	150	–
IZM 40	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	85	150	150
IZM 40	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	85	150	150
IZM 40[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	85	150	150
IZM 40[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	85	150	150
IZM 40	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	85	85	150	150

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3] An adaptor from Eaton is required for connection to 4000 A (Model No. 183976 *(IZMX–TH403–4000–1)).

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 44: Rated operating currents I_{ng} for air circuit-breakers – GE, part 1

Brand	GE													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
GG04	Static installation	1/none	400	H	400	400	400	400	600	600	600	600	600	600
GG07	Static installation	1/none	630	H	630	630	630	630	600	600	600	600	600	600
GG08	Static installation	1/none	800	H	800	800	800	800	600	600	600	600	600	600
GG10	Static installation	1/none	1000	H	1000	1000	1000	1000	600	600	600	600	600	600
GG13	Static installation	1/none	1250	H	1250	1250	1250	1250	600	600	600	600	600	600
GG16	Static installation	1/none	1600	H	1488	1392	1488	1288	600	600	600	600	600	600
GG20	Static installation	1/none	2000	H	2000	1940	2000	1870	600	600	600	600	600	600
GG04	Static installation	2	400	H	400	400	400	400	800	600	600	800	600	600
GG07	Static installation	2	630	H	630	630	630	630	800	600	600	800	600	600
GG08	Static installation	2	800	H	800	800	800	800	800	600	600	800	600	600
GG10	Static installation	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
GG13	Static installation	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
GG16	Static installation	2	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
GG20	Static installation	2	2000	H	2000	2000	2000	2000	800	600	600	800	600	600
GG25	Static installation	2	2500	H	2500	2500	2500	2500	800	600	600	800	600	600
GG32	Static installation	2	3200	H	3184	3184	3184	3184	800	600	600	800	600	600
GG40	Static installation	2	4000	H	3880	3600	3880	3420	800	600	600	800	600	600
GG04	Rack-mounted	1/none	400	H	400	400	400	400	600	600	600	600	600	600
GG07	Rack-mounted	1/none	630	H	630	630	630	630	600	600	600	600	600	600
GG08	Rack-mounted	1/none	800	H	800	800	800	800	600	600	600	600	600	600
GG10	Rack-mounted	1/none	1000	H	1000	1000	1000	1000	600	600	600	600	600	600
GG13	Rack-mounted	1/none	1250	H	1250	1250	1250	1250	600	600	600	600	600	600
GG16	Rack-mounted	1/none	1600	H	1600	1600	1600	1600	600	600	600	600	600	600
GG20	Rack-mounted	1/none	2000	H	1500	1400	1498	1300	600	600	600	600	600	600
GG04	Rack-mounted	2	400	H	400	400	400	400	800	600	600	800	600	600
GG07	Rack-mounted	2	630	H	630	630	630	630	800	600	600	800	600	600
GG08	Rack-mounted	2	800	H	800	800	800	800	800	600	600	800	600	600
GG10	Rack-mounted	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
GG13	Rack-mounted	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
GG16	Rack-mounted	2	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
GG20	Rack-mounted	2	2000	H	1700	1500	1700	1450	800	600	800	800	600	800
GG25	Rack-mounted	2	2500	H	2475	2425	1700	2350	800	600	600	800	600	600
GG32	Rack-mounted	2	3200	H	2950	2624	2944	2352	800	600	800	800	600	800
GG40 [3]	Rack-mounted	2	4000	H	3000	2600	2980	2340	800	600	600	800	600	600

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3] HT Only feasible for 800 mm box.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents Ing for air circuit-breakers – GE, part 2

Brand	GE									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw}[1]	Max. short-circuit withstand strength I_{cc}[1]	Maximum distance from first support[2]	
	L1	L2	L3	L1	L2	L3				
	top	top	top	unten	unten	unten	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	kA	kA	mm	mm
GG04	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG07	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG13	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	–
GG16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	–
GG20	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	65	65	200	–
GG04	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG07	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG13	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	200	200
GG16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	200	200
GG20	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	100	200	200
GG25	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	100	200	200
GG32	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	100	200	200
GG40	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	85	100	200	200
GG04	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG07	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	–
GG13	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	–
GG16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	–
GG20	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	65	65	200	–
GG04	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG07	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	200	200
GG13	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	200	200
GG16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	200	200
GG20	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	85	100	200	200
GG25	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	100	200	200
GG32	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	100	200	200
GG40[3]	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	85	100	200	200

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3] HT only possible with 800 mm deep field.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 45: Rated operating currents I_{ng} for air circuit-breakers – LS, ELECTRIC, part 1

Brand	LS ELECTRIC													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
Metasol AS 06 D	Static installation	1/none	200	H	200	200	200	200	600	600	600	600	600	600
Metasol AS 06 D	Static installation	1/none	400	H	400	400	400	400	600	600	600	600	600	600
Metasol AS 06 D	Static installation	1/none	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 08 D	Static installation	1/none	400	H	400	400	400	400	600	600	600	600	600	600
Metasol AS 08 D	Static installation	1/none	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 08 D	Static installation	1/none	800	H	800	800	800	800	600	600	600	600	600	600
Metasol AS 10 D	Static installation	1/none	1000	H	980	923	910	850	600	600	600	600	600	600
Metasol AS 13 D	Static installation	1/none	1250	H	1225	1150	1135	1062	600	600	600	600	600	600
Metasol AS 16 D	Static installation	1/none	1600	H	1560	1472	1450	1360	600	600	600	600	600	600
Metasol AS 20 E	Static installation	3	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 20 E	Static installation	3	800	H	800	800	800	800	600	600	600	800	600	600
Metasol AS 20 E	Static installation	3	1000	H	1000	1000	1000	1000	600	600	600	800	600	600
Metasol AS 20 E	Static installation	3	1250	H	1250	1250	1250	1250	600	600	600	800	600	600
Metasol AS 20 E	Static installation	3	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
Metasol AS 20 E	Static installation	3	2000	H	2000	2000	2000	2000	800	600	600	800	600	600
Metasol AS 25 E	Static installation	3	2500	H	2500	2500	2500	2450	800	600	600	800	600	600
Metasol AS 32 E	Static installation	3	3200	H	3150	2650	2800	2450	800	600	600	800	600	600
Metasol AS 06 D	Rack-mounted	1/none	200	H	200	200	200	200	600	600	600	600	600	600
Metasol AS 06 D	Rack-mounted	1/none	400	H	400	400	400	400	600	600	600	600	600	600
Metasol AS 06 D	Rack-mounted	1/none	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 08 D	Rack-mounted	1/none	400	H	400	400	400	400	600	600	600	600	600	600
Metasol AS 08 D	Rack-mounted	1/none	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 08 D	Rack-mounted	1/none	800	H	800	800	800	800	600	600	600	600	600	600
Metasol AS 10 D	Rack-mounted	1/none	1000	H	960	830	880	700	600	600	600	600	600	600
Metasol AS 13 D	Rack-mounted	1/none	1250	H	1225	1150	1135	1062	600	600	600	600	600	600
Metasol AS 16 D	Rack-mounted	1/none	1600	H	1560	1472	1550	1500	600	600	600	600	600	600
Metasol AS 20 E	Rack-mounted	3	630	H	630	630	630	630	600	600	600	600	600	600
Metasol AS 20 E	Rack-mounted	3	800	H	800	800	800	800	600	600	600	800	600	600
Metasol AS 20 E	Rack-mounted	3	1000	H	1000	1000	1000	1000	600	600	600	800	600	600
Metasol AS 20 E	Rack-mounted	3	1250	H	1250	1250	1250	1250	600	600	600	800	600	600
Metasol AS 20 E	Rack-mounted	3	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
Metasol AS 20 E	Rack-mounted	3	2000	H	2000	2000	2000	2000	800	600	600	800	600	600
Metasol AS 25 E	Rack-mounted	3	2500	H	2500	2500	2500	2450	800	600	600	800	600	600
Metasol AS 32 E	Rack-mounted	3	3200	H	3150	2650	2800	2450	800	600	800	800	600	800

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – LS ELECTRIC, part 2

Brand	LS ELECTRIC									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw} 1)	Max. short-circuit withstand strength I_{cc} 1)	Maximum distance from first support 2)	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm²	mm²	mm²	mm²	mm²	mm²	kA	kA	mm	mm
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 10 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	70	250	150
Metasol AS 13 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	70	250	150
Metasol AS 16 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	70	70	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	85	250	150
Metasol AS 25 E	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	85	85	250	150
Metasol AS 32 E	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	250	150
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 06 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 08 D	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	70	250	150
Metasol AS 10 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	70	250	150
Metasol AS 13 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	70	250	150
Metasol AS 16 D	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	70	70	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	1 x 100 x 10	85	85	250	150
Metasol AS 20 E	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	85	250	150
Metasol AS 25 E	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	85	85	250	150
Metasol AS 32 E	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	250	150

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 46: Rated operating currents I_{ng} for air circuit-breakers – Mitsubishi, part 1

Brand	Mitsubishi														
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions						
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
AE1000–SW	Static installation	1/none	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
AE1250–SW	Static installation	1/none	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
AE1600–SW	Static installation	1/none	1600	H	1600	1600	1600	1600	800	600	600	800	600	600
AE2000–SW	Static installation	1/none	2000	H	2000	1900	1600	1600	800	600	600	800	600	600
AE2500–SW	Static installation	1/none	2500	H	2500	2375	2000	2000	800	600	600	800	600	600
AE3200–SW	Static installation	1/none	3200	H	3100	2880	2560	1950	800	600	600	800	600	600
AE1000–SW	Rack-mounted	1/none	1000	H	1000	1000	1000	1000	800	800	600	800	800	600
AE1250–SW	Rack-mounted	1/none	1250	H	1250	1250	1250	1250	800	800	600	800	800	600
AE1600–SW	Rack-mounted	1/none	1600	H	1600	1600	1600	1600	800	800	600	800	800	600
AE2000–SW	Rack-mounted	1/none	2000	H	2000	1900	1600	1600	800	800	600	800	800	600
AE2500–SW	Rack-mounted	1/none	2500	H	2500	2375	2000	2000	800	800	600	800	800	600
AE3200–SW	Rack-mounted	1/none	3200	H	3100	2880	2560	1950	800	800	600	800	800	600

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – Mitsubishi, part 2

Brand	Mitsubishi									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw} 1)	Max. short-circuit withstand strength I_{cc} 1)	Maximum distance from first support 2)	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	kA	kA	mm	mm
AE1000–SW	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	200
AE1250–SW	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	200
AE1600–SW	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	200
AE2000–SW	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	75	75	200	200
AE2500–SW	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	75	75	200	200
AE3200–SW	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	75	75	200	200
AE1000–SW	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	200	200
AE1250–SW	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	200
AE1600–SW	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	200	200
AE2000–SW	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	75	75	200	200
AE2500–SW	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	75	75	200	200
AE3200–SW	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	75	75	200	200

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 47: Rated operating currents I_{ng} for air circuit-breakers – Schneider Electric, part 1

Brand	Schneider Electric														
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions						
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
MTZ1 NT06	Static installation	1	630	H	630	630	630	630	400	600	600	600	600	600
MTZ1 NT08	Static installation	1	800	H	800	800	800	800	400	600	600	600	600	600
MTZ1 NT10	Static installation	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
MTZ1 NT12	Static installation	1	1250	H	1250	1220	1250	1140	400	600	600	600	600	600
MTZ1 NT16	Static installation	1	1600	H	1420	1320	1320	1180	400	600	600	600	600	600
MTZ2 NW08	Static installation	2	800	H	800	800	800	800	800	600	600	800	600	600
MTZ2 NW10	Static installation	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
MTZ2 NW12	Static installation	2	1250	H	1250	1250	1250	1140	800	600	600	800	600	600
MTZ2 NW16	Static installation	2	1600	H	1600	1520	1500	1250	800	600	600	800	600	600
MTZ2 NW20	Static installation	2	2000	H	2000	1900	1900	1700	800	600	600	800	600	600
MTZ2 NW25[3)]	Static installation	2	2500	H	2500	2300	2300	1905	800	600	600	800	600	600
MTZ2 NW32[3)]	Static installation	2	3200	H	3200	2830	2900	2180	800	600	600	800	600	600
MTZ2 NW40	Static installation	2	4000	H	4000	3120	3120	1950	800	600	600	800	600	600
MTZ3 NW40b	Static installation	3	4000	H	4000	3320	3320	3000	1000	600	800	1200	600	800
MTZ3 NW40b	Static installation	3	4000	V	4000	3470	4000	3000	1000	600	800	1200	600	800
MTZ3 NW50	Static installation	3	5000	V	5000	3920	5000	3000	1000	600	800	1200	600	800
MTZ3 NW63	Static installation	3	6300	V	6300	4120	6300	3140	1000	600	800	1200	600	800
MTZ1 NT06[4)]	Rack-mounted	1	630	H	630	630	630	630	400	600	600	600	600	600
MTZ1 NT08[4)]	Rack-mounted	1	800	H	800	800	800	800	400	600	600	600	600	600
MTZ1 NT10[4)]	Rack-mounted	1	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
MTZ1 NT12[4)]	Rack-mounted	1	1250	H	1250	1220	1250	1140	400	600	600	600	600	600
MTZ1 NT16[4)]	Rack-mounted	1	1600	H	1420	1320	1320	1180	400	600	600	600	600	600
MTZ2 NW08	Rack-mounted	2	800	H	800	800	800	800	800	600	600	800	600	600
MTZ2 NW10	Rack-mounted	2	1000	H	1000	1000	1000	1000	800	600	600	800	600	600
MTZ2 NW12	Rack-mounted	2	1250	H	1250	1250	1250	1140	800	600	600	800	600	600
MTZ2 NW16	Rack-mounted	2	1600	H	1600	1520	1500	1250	800	600	600	800	600	600
MTZ2 NW20	Rack-mounted	2	2000	H	2000	1900	1900	1700	800	600	600	800	600	600
MTZ2 NW25[3)]	Rack-mounted	2	2500	H	2500	2300	2300	1905	800	600	600	800	600	600
MTZ2 NW32[3)]	Rack-mounted	2	3200	H	3200	2830	2900	2180	800	600	600	800	600	600
MTZ2 NW40	Rack-mounted	2	4000	H	3400	3120	3120	1950	800	600	600	800	600	600
MTZ3 NW40b	Rack-mounted	3	4000	H	4000	3320	3320	3010	1000	600	800	1200	600	800
MTZ3 NW40b	Rack-mounted	3	4000	V	4000	3470	4000	3000	1000	600	800	1200	600	800
MTZ3 NW50	Rack-mounted	3	5000	V	5000	3920	5000	3000	1000	600	800	1200	600	800
MTZ3 NW63	Rack-mounted	3	6300	V	6300	4120	6300	3140	1000	600	800	1200	600	800

[1)] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2)] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3)] Connection extension 4000 A required (3-pol. model no. LV847970SP (2 x); 4 pol. model no. LV847971SP (2 x))
[4)] VT only possible in 600 mm wide sections.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – Schneider ELECTRIC, part 2

Brand	**Schneider Electric**									
Type	**Connection cross-section, connection kits, top**			**Connection cross-section, connection kits, bottom**			**Max. short-circuit withstand strength I_{cw}[1]**	**Max. short-circuit withstand strength I_{cc}[1]**	**Maximum distance from first support[2]**	
	L1	**L2**	**L3**	**L1**	**L2**	**L3**				
	top	**top**	**top**	**bottom**	**bottom**	**bottom**	**at 400 V AC**	**at 400 V AC**	**up to 50 kA**	**up to 100 kA**
ACB	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	kA	kA	mm	mm
MTZ1 NT06	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	300	–
MTZ1 NT08	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	300	–
MTZ1 NT10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	300	–
MTZ1 NT12	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	300	–
MTZ1 NT16	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	42	50	300	–
MTZ2 NW08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	300	150
MTZ2 NW10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW20	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	85	100	300	150
MTZ2 NW25[3]	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	100	300	150
MTZ2 NW32[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	100	300	150
MTZ2 NW40	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	85	100	300	150
MTZ3 NW40b	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	100	100	300	150
MTZ3 NW40b	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	300	150
MTZ3 NW50	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	8 x 60 x 10	8 x 60 x 10	8 x 60 x 10	100	100	300	150
MTZ3 NW63	8 x 100 x 10	8 x 100 x 10	8 x 100 x 10	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	100	100	300	150
MTZ1 NT06[4]	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	300	–
MTZ1 NT08[4]	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	42	50	300	–
MTZ1 NT10[4]	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	300	–
MTZ1 NT12[4]	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	42	50	300	–
MTZ1 NT16[4]	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	3 x 50 x 10	42	50	300	–
MTZ2 NW08	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	85	100	300	150
MTZ2 NW10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW16	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	85	100	300	150
MTZ2 NW20	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	2 x 80 x 10	85	100	300	150
MTZ2 NW25[3]	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	85	100	300	150
MTZ2 NW32[3]	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	85	100	300	150
MTZ2 NW40	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	85	100	300	150
MTZ3 NW40b	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	100	100	300	150
MTZ3 NW40b	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	300	150
MTZ3 NW50	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	8 x 60 x 10	8 x 60 x 10	8 x 60 x 10	100	100	300	150
MTZ3 NW63	8 x 100 x 10	8 x 100 x 10	8 x 100 x 10	8 x 80 x 10	8 x 80 x 10	8 x 80 x 10	100	100	300	150

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
3) Connection extension 4000 A required (3-pol. model no. LV847970SP (2 x); 4 pol. model no. LV847971SP (2 x))
4) VT only possible in 600 mm wide sections.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 48: Rated operating currents I_{ng} for air circuit-breakers – Siemens, part 1

Brand	Siemens													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
3WL/3WA10	Static installation	0	630	H	630	630	630	630	400	600	600	600	600	600
3WL/3WA10	Static installation	0	800	H	800	800	800	800	400	600	600	600	600	600
3WL/3WA10	Static installation	0	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
3WL/3WA10	Static installation	0	1250	H	1250	1250	1250	1000	400	600	600	600	600	600
3WL/3WA11	Static installation	1	630	H	630	630	630	630	600	600	600	600	600	600
3WL/3WA11	Static installation	1	800	H	800	800	800	720	600	600	600	600	600	600
3WL/3WA11	Static installation	1	1000	H	1000	1000	1000	850	600	600	600	600	600	600
3WL/3WA11	Static installation	1	1250	H	1250	1250	1250	1000	600	600	600	600	600	600
3WL/3WA11	Static installation	1	1600	H	1540	1360	1360	1232	600	600	600	600	600	600
3WL/3WA11	Static installation	1	2000	H	1890	1670	1650	1350	600	600	600	600	600	600
3WL/3WA12	Static installation	2	800	H	800	800	800	800	800	600	600	800	600	600
3WL/3WA12	Static installation	2	1000	H	1000	1000	1000	777	800	600	600	800	600	600
3WL/3WA12	Static installation	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
3WL/3WA12	Static installation	2	1600	H	1540	1520	1520	1232	800	600	600	800	600	600
3WL/3WA12	Static installation	2	2000	H	1965	1900	1900	1574	800	600	600	800	600	600
3WL/3WA12	Static installation	2	2500	H	2500	2275	2350	1950	800	600	600	800	600	600
3WL/3WA12	Static installation	2	3200	H	2912	2688	2784	2240	800	600	600	800	600	600
3WL/3WA13	Static installation	3	4000	H	4000	3400	3760	2600	800	600	800	1200	600	800
3WL/3WA13	Static installation	3	4000	V	4000	3440	4000	2710	800	600	800	1200	600	800
3WL/3WA13	Static installation	3	5000	V	5000	3800	5000	3000	1000	600	800	1200	600	800
3WL/3WA13	Static installation	3	6300	V	6300	4080	6300	3100	1000	600	800	1200	600	800
3WL/3WA10	Rack-mounted	0	630	H	630	630	630	630	400	600	600	600	600	600
3WL/3WA10	Rack-mounted	0	800	H	800	800	800	800	400	600	600	600	600	600
3WL/3WA10	Rack-mounted	0	1000	H	1000	1000	1000	1000	400	600	600	600	600	600
3WL/3WA10	Rack-mounted	0	1250	H	1250	1250	1250	1000	400	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	630	H	630	630	630	630	600	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	800	H	800	800	800	720	600	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	1000	H	1000	1000	1000	850	600	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	1250	H	1250	1250	1250	1000	600	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	1600	H	1540	1360	1360	1232	600	600	600	600	600	600
3WL/3WA11	Rack-mounted	1	2000	H	1700	1650	1230	1115	600	600	600	600	600	600
3WL/3WA12	Rack-mounted	2	800	H	800	800	800	800	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	1000	H	1000	1000	1000	777	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	1250	H	1250	1250	1250	1250	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	1600	H	1540	1520	1520	1232	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	2000	H	1965	1900	1900	1574	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	2500	H	2500	2275	2350	1950	800	600	600	800	600	600
3WL/3WA12	Rack-mounted	2	3200	H	2912	2688	2784	2240	800	600	600	800	600	600
3WL/3WA13	Rack-mounted	3	4000	H	4000	3400	3760	2600	800	600	800	1200	600	800
3WL/3WA13	Rack-mounted	3	4000	V	4000	3440	4000	2710	800	600	800	1200	600	800
3WL/3WA13	Rack-mounted	3	5000	V	5000	3800	5000	3000	1000	600	800	1200	600	800
3WL/3WA13	Rack-mounted	3	6300	V	6300	4080	6300	3100	1000	600	800	1200	600	800

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
[3] Installation in 800 mm wide enclosure possible after consultation.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – Siemens, part 2

Brand	Siemens									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw} 1)	Max. short-circuit withstand strength I_{cc} 1)	Maximum distance from first support 2)	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50 kA	up to 100 kA
ACB	mm^2	mm^2	mm^2	mm^2	mm^2	mm^2	kA	kA	mm	mm
3WL/3WA10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	50	66	–	–
3WL/3WA10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	50	66	–	–
3WL/3WA10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	50	66	–	–
3WL/3WA10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	50	66	–	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	50	85	100	–
3WL/3WA11	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	50	85	100	–
3WL/3WA11	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	50	85	100	–
3WL/3WA12	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	100	100	100	100
3WL/3WA12	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	100	100	100	100
3WL/3WA12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	100	100
3WL/3WA12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	100	100
3WL/3WA12	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	100	100	100	100
3WL/3WA12	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	100	100
3WL/3WA12	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	100	100
3WL/3WA13	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	100	100	100	100
3WL/3WA13	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	100	100
3WL/3WA13	6 x 100 x 10	6 x 100 x 10	6 x 100 x 10	6 x 80 x 10	6 x 80 x 10	6 x 80 x 10	100	100	100	100
3WL/3WA13	6 x 120 x 10	6 x 120 x 10	6 x 120 x 10	6 x 100 x 10	6 x 100 x 10	6 x 100 x 10	100	100	100	100
3WL/3WA10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	50	66	–	–
3WL/3WA10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	1 x 50 x 10	50	66	–	–
3WL/3WA10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	50	66	–	–
3WL/3WA10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	2 x 50 x 10	50	66	–	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	50	85	100	–
3WL/3WA11	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	50	85	100	–
3WL/3WA11	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	50	85	100	–
3WL/3WA11	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	50	85	100	–
3WL/3WA12	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	100	100	100	100
3WL/3WA12	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	100	100	100	100
3WL/3WA12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	100	100
3WL/3WA12	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	100	100
3WL/3WA12	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	100	100	100	100
3WL/3WA12	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	100	100
3WL/3WA12	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	100	100
3WL/3WA13	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	3 x 120 x 10	100	100	100	100
3WL/3WA13	4 x 100 x 10	4 x 100 x 10	4 x 100 x 10	4 x 80 x 10	4 x 80 x 10	4 x 80 x 10	100	100	100	100
3WL/3WA13	6 x 100 x 10	6 x 100 x 10	6 x 100 x 10	6 x 80 x 10	6 x 80 x 10	6 x 80 x 10	100	100	100	100
3WL/3WA13	6 x 120 x 10	6 x 120 x 10	6 x 120 x 10	6 x 100 x 10	6 x 100 x 10	6 x 100 x 10	100	100	100	100

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.
3) Installation in 800 mm wide enclosure possible after consultation.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Table 49: Rated operating currents I_{ng} for air circuit-breakers – Terasaki, part 1

Brand	Terasaki													
Type	Design	Size	I_n Circuit-breaker	Brackets horizontal/ vertical pos.	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions					
					vent.		vent.		3-pole version			4-pole version		
					IP2X	IP2X	IP54	IP54	Width	Height	Depth	Width	Height	Depth
ACB			A	V/H	A	A	A	A	mm	mm	mm	mm	mm	mm
AR208S	Static installation	2	800	H	800	720	720	520	600	600	600	–	–	–
AR212S	Static installation	2	1250	H	1250	1125	1125	1250	600	600	600	–	–	–
AR216	Static installation	2	1600	H	1600	1440	1440	1040	600	600	600	–	–	–
AR220	Static installation	2	2000	H	2000	1700	1700	1300	600	600	600	–	–	–
AR316H	Static installation	3	1600	H	1600	1440	1440	1040	600	600	600	–	–	–
AR320H	Static installation	3	2000	H	2000	1700	1700	1300	600	600	600	–	–	–
AR325H	Static installation	3	2500	H	2500	2125	2125	1625	600	600	600	–	–	–
AR332H	Static installation	3	3200	H	3200	2720	2560	2080	600	600	600	–	–	–
AR208S	Rack-mounted	2	800	H	800	720	720	520	600	600	600	–	–	–
AR212S	Rack-mounted	2	1250	H	1250	1125	1125	1250	600	600	600	–	–	–
AR216	Rack-mounted	2	1600	H	1600	1440	1440	1040	600	600	600	–	–	–
AR220	Rack-mounted	2	2000	H	2000	1700	1700	1300	600	600	600	–	–	–
AR316H	Rack-mounted	3	1600	H	1600	1440	1440	1040	600	600	600	–	–	–
AR320H	Rack-mounted	3	2000	H	2000	1700	1700	1300	600	600	600	–	–	–
AR325H	Rack-mounted	3	2500	H	2500	2125	2125	1625	600	600	600	–	–	–
AR332H	Rack-mounted	3	3200	H	3200	2720	2560	2080	600	600	600	–	–	–

[1] Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
[2] Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for ACB (air circuit-breakers)

Rated operating currents I_{ng} for air circuit-breakers – Terasaki, part 2

Brand	Terasaki									
Type	Connection cross-section, connection kits, top			Connection cross-section, connection kits, bottom			Max. short-circuit withstand strength I_{cw} 1)	Max. short-circuit withstand strength I_{cc} 1)	Maximum distance from first support 2)	
	L1	L2	L3	L1	L2	L3				
	top	top	top	bottom	bottom	bottom	at 400 V AC	at 400 V AC	up to 50/65/80 kA	up to 100 kA
ACB	mm²	mm²	mm²	mm²	mm²	mm²	kA	kA	mm	mm
AR208S	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	150	–
AR212S	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	150	–
AR216	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	150	–
AR220	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	65	65	150	–
AR316H	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	250	150
AR320H	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	100	100	250	150
AR325H	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	100	100	250	150
AR332H	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	250	150
AR208S	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	1 x 60 x 10	65	65	150	–
AR212S	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	150	–
AR216	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	65	65	150	–
AR220	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	65	65	150	–
AR316H	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	2 x 60 x 10	100	100	250	150
AR320H	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	3 x 60 x 10	100	100	250	150
AR325H	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	2 x 100 x 10	100	100	250	150
AR332H	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	3 x 100 x 10	100	100	250	150

1) Switch must be selected with the required breaking capacity I_{cu} and the required short-time withstand current strength I_{cw}.
2) Solid copper bars must be supported with SV 9660.205 in accordance with the VX25 Ri4Power assembly instructions.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 50: Rated operating currents I_{ng} for moulded-case circuit-breakers – ABB, part 1

Brand	ABB										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1)]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
T_{max} XT1	1	16	16	16	16	16	400	150	400	150	horizontal
T_{max} XT1	1	20	20	20	20	20	400	150	400	150	horizontal
T_{max} XT1	1	25	25	25	25	25	400	150	400	150	horizontal
T_{max} XT1	1	32	32	32	32	32	400	150	400	150	horizontal
T_{max} XT1	1	40	40	40	40	40	400	150	400	150	horizontal
T_{max} XT1	1	50	50	50	50	50	400	150	400	150	horizontal
T_{max} XT1	1	63	63	57	63	55	400	150	400	150	horizontal
T_{max} XT1	1	80	80	73	80	70	400	150	400	150	horizontal
T_{max} XT1	1	100	100	86	100	82	400	150	400	150	horizontal
T_{max} XT1	1	125	125	100	125	96	400	200	400	200	horizontal
T_{max} XT1	1	160	150	120	150	115	400	200	400	200	horizontal
T_{max} XT2	2	1.6	1.6	1.6	1.6	1.6	400	150	400	200	horizontal
T_{max} XT2	2	2	2	2	2	2	400	150	400	200	horizontal
T_{max} XT2	2	2.5	2.5	2.5	2.5	2.5	400	150	400	200	horizontal
T_{max} XT2	2	3.2	3.2	3.2	3.2	3.2	400	150	400	200	horizontal
T_{max} XT2	2	4	4	4	4	4	400	150	400	200	horizontal
T_{max} XT2	2	5	5	5	5	5	400	150	400	200	horizontal
T_{max} XT2	2	6.3	6.3	6.3	6.3	6.3	400	150	400	200	horizontal
T_{max} XT2	2	8	8	8	8	8	400	150	400	200	horizontal
T_{max} XT2	2	10	10	10	10	10	400	150	400	200	horizontal
T_{max} XT2	2	12.5	12.5	12.5	12.5	12.5	400	150	400	200	horizontal
T_{max} XT2	2	16	16	16	16	16	400	150	400	200	horizontal
T_{max} XT2	2	20	20	20	20	20	400	150	400	200	horizontal
T_{max} XT2	2	25	25	25	25	25	400	150	400	200	horizontal
T_{max} XT2	2	32	32	32	32	32	400	150	400	200	horizontal
T_{max} XT2	2	40	40	40	40	40	400	150	400	200	horizontal
T_{max} XT2	2	50	50	50	50	50	400	150	400	200	horizontal
T_{max} XT2	2	63	63	63	63	63	400	150	400	200	horizontal
T_{max} XT2	2	80	80	80	80	80	400	150	400	200	horizontal
T_{max} XT2	2	100	100	100	100	95	400	150	400	200	horizontal
T_{max} XT2	2	125	125	115	125	110	400	200	400	200	horizontal
T_{max} XT2	2	160	160	140	160	135	400	200	400	200	horizontal
T_{max} XT3	3	63	63	63	63	63	400	150	400	200	horizontal
T_{max} XT3	3	80	80	80	80	80	400	150	400	200	horizontal
T_{max} XT3	3	100	100	100	100	100	400	150	400	200	horizontal
T_{max} XT3	3	125	125	125	125	125	400	200	400	200	horizontal
T_{max} XT3	3	160	160	160	160	160	400	200	400	200	horizontal
T_{max} XT3	3	200	200	165	200	155	400	200	400	200	horizontal
T_{max} XT3	3	250	240	190	240	180	600	200	600	200	horizontal

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating current currents I_{ng} for moulded-case circuit-breakers – ABB, part 2

Brand	ABB							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	Maximum distance from first support[3]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
T_{max} XT1	4	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	4	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	6	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	6	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	10	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	10	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	16	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	25	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	35	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	50	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT1	95	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	2.5	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	4	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	4	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	6	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	6	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	10	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	10	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	16	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	25	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	35	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	50	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT2	95	50	60	1 x 15 x 5	50	6 x 9 x 0.8	50	200
T_{max} XT3	16	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT3	25	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT3	35	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT3	50	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT3	70	50	60	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
T_{max} XT3	95	50	60	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
T_{max} XT3	120	50	60	1 x 20 x 10	50	10 x 15.5 x 0.8	50	200

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – ABB, part 3

Brand	ABB										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
T_{max} XT4	4	16	16	16	16	16	400	150	400	200	horizontal
T_{max} XT4	4	20	20	20	20	20	400	150	400	200	horizontal
T_{max} XT4	4	25	25	25	25	25	400	150	400	200	horizontal
T_{max} XT4	4	32	32	32	32	32	400	150	400	200	horizontal
T_{max} XT4	4	40	40	40	40	40	400	150	400	200	horizontal
T_{max} XT4	4	50	50	50	50	50	400	150	400	200	horizontal
T_{max} XT4	4	63	63	63	63	63	400	150	400	200	horizontal
T_{max} XT4	4	80	80	80	80	80	400	150	400	200	horizontal
T_{max} XT4	4	100	100	100	100	100	400	150	400	200	horizontal
T_{max} XT4	4	125	125	125	125	125	400	200	400	200	horizontal
T_{max} XT4	4	160	160	160	160	160	400	200	400	200	horizontal
T_{max} XT4	4	200	200	195	200	190	400	200	400	200	horizontal
T_{max} XT4	4	225	225	225	225	215	400	200	400	200	horizontal
T_{max} XT4	4	250	250	225	250	215	600	200	600	200	horizontal
T_{max} XT5	5	320	320	320	320	315	600	200	600	300	horizontal
T_{max} XT5	5	400	400	370	400	362	600	300	600	300	horizontal
T_{max} XT5	5	500	500	410	500	400	600	300	600	300	horizontal
T_{max} XT5	5	630	580	460	580	450	600	300	600	300	horizontal
T_{max} XT5	5	320	320	320	320	315	600	300	600	300	vertical
T_{max} XT5	5	400	400	370	400	362	600	300	600	300	vertical
T_{max} XT5	5	500	500	410	500	400	600	300	600	300	vertical
T_{max} XT5	5	630	580	460	580	450	600	300	600	300	vertical
T_{max} T6	6	630	567	504	567	504	600	300	600	300	horizontal
T_{max} T6	6	630	567	504	567	504	600	400	600	400	vertical
T_{max} T6	6	800	720	640	640	640	600	400	600	400	vertical
T_{max} T6	6	1000	900	800	800	800	600	600	600	600	vertical
T_{max} XT7/T7	7	400	368	356	368	356	600	600	600	600	vertical
T_{max} XT7/T7	7	630	567	504	567	504	600	600	600	600	vertical
T_{max} XT7/T7	7	800	720	640	640	640	600	600	600	600	vertical
T_{max} XT7/T7	7	1000	900	800	800	800	600	600	600	600	vertical
T_{max} XT7/T7	7	1250	1125	1000	1000	1000	600	600	600	600	vertical
T_{max} XT7/T7	7	1600	1440	1280	1440	1280	600	600	600	600	vertical

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – ABB, part 4

Brand	ABB							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support3)
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}2)	Maximum distance from first support3)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}2)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}2)	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
T_{max} XT4	4	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	4	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	6	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	6	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	10	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	10	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	16	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	25	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	35	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	50	50	60	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
T_{max} XT4	70	50	60	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
T_{max} XT4	95	50	60	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
T_{max} XT4	120	50	60	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
T_{max} XT4	120	50	60	1 x 20 x 10	50	10 x 15.5 x 0.8	50	200
T_{max} XT5	240	50	150	1 x 30 x 5	50	5 x 32 x 1.0	50	150
T_{max} XT5	2 x 150	50	150	1 x 30 x 10	50	5 x 32 x 1.0	50	150
T_{max} XT5	2 x 185	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
T_{max} XT5	2 x 240	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
T_{max} XT5	240	50	150	1 x 30 x 10	50	5 x 32 x 1.0	50	150
T_{max} XT5	2 x 150	50	150	1 x 30 x 10	50	5 x 32 x 1.0	50	150
T_{max} XT5	2 x 185	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
T_{max} XT5	2 x 240	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
T_{max} T6	2 x 240 4)	50	300	1 x 40 x 10	50	1 x 10 x 40 x 1.0	40	300
T_{max} T6	2 x 240 4)	50	300	1 x 40 x 10	50	1 x 10 x 40 x 1.0	40	300
T_{max} T6	3 x 185 4)	50	300	2 x 40 x 10	50	2 x 10 x 40 x 1.0	40	300
T_{max} T6	4 x 150 4)	50	300	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	300
T_{max} XT7/T7	2 x 150 4)	50	200	1 x 50 x 10	50	1 x 10 x 50 x 1.0	40	150
T_{max} XT7/T7	2 x 240 4)	50	200	1 x 50 x 10	50	1 x 10 x 50 x 1.0	40	150
T_{max} XT7/T7	3 x 185 4)	50	200	2 x 50 x 10	50	2x 10 x 50 x 1.0	40	150
T_{max} XT7/T7	4 x 150 4)	50	200	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150
T_{max} XT7/T7	4 x 240 4)	50	200	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150
T_{max} XT7/T7	–	–	–	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 51: Rated operating currents I_{ng} for moulded-case circuit-breakers – Eaton, part 1

Brand	Eaton										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
NZM..1	1	20	18	17	18	17	400	150	400	150	horizontal
NZM..1	1	25	23	22	23	22	400	150	400	150	horizontal
NZM..1	1	32	29	28	29	28	400	150	400	150	horizontal
NZM..1	1	40	36	35	36	35	400	150	400	150	horizontal
NZM..1	1	50	45	44	45	44	400	150	400	150	horizontal
NZM..1	1	63	57	55	57	55	400	150	400	150	horizontal
NZM..1	1	80	72	70	72	70	400	150	400	150	horizontal
NZM..1	1	100	90	87	90	87	400	150	400	150	horizontal
NZM..1	1	125	113	109	113	109	400	150	400	150	horizontal
NZM..1	1	160	144	139	144	139	400	150	400	150	horizontal
NZM..2	2	20	18	17	18	17	400	150	400	200	horizontal
NZM..2	2	25	23	22	23	22	400	150	400	200	horizontal
NZM..2	2	32	29	28	29	28	400	150	400	200	horizontal
NZM..2	2	40	36	35	36	35	400	150	400	200	horizontal
NZM..2	2	50	45	44	45	44	400	150	400	200	horizontal
NZM..2	2	63	57	55	57	55	400	150	400	200	horizontal
NZM..2	2	80	72	70	72	70	400	150	400	200	horizontal
NZM..2	2	100	90	87	90	87	400	150	400	200	horizontal
NZM..2	2	125	113	109	113	109	400	150	400	200	horizontal
NZM..2	2	160	144	139	144	139	400	150	400	200	horizontal
NZM..2	2	200	182	174	182	174	400	150	400	200	horizontal
NZM..2	2	250	228	218	228	218	600	150	600	200	horizontal
NZM..2	2	300	273	261	273	261	600	150	600	200	horizontal
NZM..3	3	320	291	278	291	278	600	200	600	300	horizontal
NZM..3	3	350	322	312	322	312	600	200	–	–	horizontal
NZM..3	3	400	368	356	368	356	600	200	600	300	horizontal
NZM..3	3	450	405	360	405	360	600	300	–	–	horizontal
NZM..3	3	500	450	400	450	400	600	300	600	300	horizontal
NZM..3	3	550	495	440	495	440	600	300	–	–	horizontal
NZM..3	3	630	567	504	567	504	600	300	600	300	horizontal
NZM..3	3	320	291	278	291	278	600	400	600	400	vertical
NZM..3	3	350	322	312	322	312	600	400	–	–	vertical
NZM..3	3	400	368	356	368	356	600	400	600	400	vertical
NZM..3	3	450	405	360	405	360	600	400	–	–	vertical
NZM..3	3	500	450	400	450	400	600	400	600	400	vertical
NZM..3	3	550	495	440	495	440	600	400	–	–	vertical
NZM..3	3	630	567	504	567	504	600	400	600	400	vertical
NZM..4	4	800	720	640	640	640	600	600	600	600	vertical
NZM..4	4	875	788	700	700	700	600	600	600	600	vertical
NZM..4	4	1000	900	800	800	800	600	600	600	600	vertical
NZM..4	4	1250	1125	1000	1000	1000	600	600	600	600	vertical
NZM..4	4	1400	1260	1120	1260	1120	600	600	–	–	vertical
NZM..4	4	1600	1440	1280	1440	1280	600	600	600	600	vertical

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Eaton, part 2

Brand	Eaton							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
NZM..1	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	16	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	25	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	35	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	50	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..1	95	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	10	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	16	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	25	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	35	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	50	50	200	1 x 15 x 5	50	6 x 9 x 0.8	50	300
NZM..2	70	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	300
NZM..2	95	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	300
NZM..2	150	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	300
NZM..2	240	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	300
NZM..3	240	50	200	1 x 30 x 5	50	10 x 24 x 1.0	50	300
NZM..3	2 x 150	50	200	1 x 30 x 5	50	10 x 24 x 1.0	50	300
NZM..3	2 x 150	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 240	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	240	50	200	1 x 30 x 5	50	10 x 24 x 1.0	50	300
NZM..3	2 x 150	50	200	1 x 30 x 5	50	10 x 24 x 1.0	50	300
NZM..3	2 x 150	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 185	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..3	2 x 240	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	300
NZM..4	3 x 185	50	150	1 x 50 x 10	50	1 x 10 x 50 x 1.0	40	150
NZM..4	3 x 185	50	150	1 x 50 x 10	50	1 x 10 x 50 x 1.0	40	150
NZM..4	2x300/ 4 x 150	50	150	1 x 50 x 10	50	1 x 10 x 50 x 1.0	40	150
NZM..4	4 x 185	50	150	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150
NZM..4	4 x 185	50	150	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150
NZM..4	4 x 240	50	150	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	150

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 52: Rated operating currents I_{ng} for moulded-case circuit-breakers – GE, part 1

Brand	GE										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
FD160	D	16	16	16	16	16	400	150	400	150	horizontal
FD160	D	20	20	20	20	20	400	150	400	150	horizontal
FD160	D	25	25	25	25	25	400	150	400	150	horizontal
FD160	D	32	32	32	32	32	400	150	400	150	horizontal
FD160	D	40	40	40	40	40	400	150	400	150	horizontal
FD160	D	50	50	50	50	50	400	150	400	150	horizontal
FD160	D	63	63	63	63	63	400	150	400	150	horizontal
FD160	D	80	80	80	80	80	400	150	400	150	horizontal
FD160	D	100	100	100	100	100	400	150	400	150	horizontal
FD160	D	125	125	125	125	125	400	150	400	150	horizontal
FD160	D	160	160	160	160	160	400	150	400	200	horizontal
FE160	E	25	25	25	25	25	400	150	400	200	horizontal
FE160	E	32	32	32	32	32	400	150	400	200	horizontal
FE160	E	40	40	40	40	40	400	150	400	200	horizontal
FE160	E	50	50	50	50	50	400	150	400	200	horizontal
FE160	E	63	63	63	63	63	400	150	400	200	horizontal
FE160	E	80	80	80	80	80	400	150	400	200	horizontal
FE160	E	100	100	100	100	100	400	150	400	200	horizontal
FE160	E	125	125	125	125	125	400	150	400	200	horizontal
FE160	E	160	160	160	160	160	400	150	400	200	horizontal
FE250	E	125	125	125	125	125	400	150	400	200	horizontal
FE250	E	160	160	160	160	160	400	150	400	200	horizontal
FE250	E	200	200	200	200	200	400	150	400	200	horizontal
FE250	E	250	250	250	250	250	600	150	600	200	horizontal
FG400	G	250	250	250	250	250	600	200	600	300	horizontal
FG400	G	350	350	350	350	350	600	200	600	300	horizontal
FG400	G	400	400	400	400	400	600	200	600	300	horizontal
FG630	G	400	400	400	400	400	600	200	600	300	horizontal
FG630	G	500	500	500	500	500	600	200	600	300	horizontal
FG630	G	630	590	570	590	530	600	200	600	300	horizontal
FG400	G	250	250	250	250	250	600	400	600	400	vertical
FG400	G	350	350	350	350	350	600	400	600	400	vertical
FG400	G	400	400	400	400	400	600	400	600	400	vertical
FG630	G	400	400	400	400	400	600	400	600	400	vertical
FG630	G	500	500	500	500	500	600	400	600	400	vertical
FG630	G	630	590	570	590	530	600	400	600	400	vertical

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – GE, part 2

Brand	GE							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support³⁾
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} ²⁾	Maximum distance from first support³⁾	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} ²⁾	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} ²⁾	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
FD160	4	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	6	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	6	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	10	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	10	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	16	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	25	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	35	50	150	1 x 12 x 5	50	6 x 9 x 0.8	50	200
FD160	50	50	150	1 x 12 x 5	50	2 x 6 x 9 x 0.8	50	200
FD160	70	50	150	1 x 12 x 10	50	2 x 6 x 9 x 0.8	50	200
FD160	95	50	150	1 x 12 x 10	50	2 x 6 x 9 x 0.8	50	200
FE160	4	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	6	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	10	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	16	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	25	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	35	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	50	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	70	50	150	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
FE160	95	50	150	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
FE250	70	50	150	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
FE250	95	50	150	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
FE250	120	50	150	1 x 20 x 10	50	5 x 24 x 1	50	200
FE250	150	50	150	1 x 20 x 10	50	10 x 24 x 1	50	150
FG400	150	50	150	1 x 30 x 5	50	5 x 32 x 1.0	50	150
FG400	185	50	150	1 x 30 x 10	50	10 x 24 x 1.0	50	150
FG400	2 x 150	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	240	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	2 x 150	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	2 x 185	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG400	150	50	150	1 x 30 x 5	50	5 x 32 x 1.0	50	150
FG400	185	50	150	1 x 30 x 10	50	10 x 24 x 1.0	50	150
FG400	2 x 150	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	240	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	2 x 150	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150
FG630	2 x 185	50	150	1 x 30 x 10	50	10 x 32 x 1.0	50	150

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer’s specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 53: Rated operating currents I_{ng} for moulded-case circuit-breakers – LS ELECTRIC, part 1

Brand	LS ELECTRIC										
Type	Size	In Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
30 AF S	fixed	3	3	3	3	2	400	200	300	200	horizontal
30 AF S	fixed	5	5	5	5	4	400	200	300	200	horizontal
30 AF S	fixed	10	10	10	10	8	400	200	300	200	horizontal
30 AF S	fixed	15	15	15	15	11	400	200	300	200	horizontal
30 AF S	fixed	20	20	20	20	15	400	200	300	200	horizontal
30 AF S	fixed	30	30	30	30	23	400	200	300	200	horizontal
50 AF N/S/H	fixed	15	15	15	15	11	400	200	300	200	horizontal
50 AF N/S/H	fixed	20	20	20	20	15	400	200	300	200	horizontal
50 AF N/S/H	fixed	30	30	30	30	23	400	200	300	200	horizontal
50 AF N/S/H	fixed	40	40	40	40	30	400	200	300	200	horizontal
50 AF N/S/H	fixed	50	50	40	40	38	400	200	300	200	horizontal
60 AF N/S	fixed	15	15	15	15	11	400	200	300	200	horizontal
60 AF N/S	fixed	20	20	20	20	15	400	200	300	200	horizontal
60 AF N/S	fixed	30	30	30	30	23	400	200	300	200	horizontal
60 AF N/S	fixed	40	40	40	40	30	400	200	300	200	horizontal
60 AF N/S	fixed	50	50	40	40	38	400	200	300	200	horizontal
60 AF N/S	fixed	60	60	60	60	45	400	200	300	200	horizontal
100 AF N	fixed	15	15	15	15	15	400	200	300	200	horizontal
100 AF N	fixed	20	20	20	20	20	400	200	300	200	horizontal
100 AF N	fixed	30	30	30	30	30	400	200	300	200	horizontal
100 AF N	fixed	40	40	40	40	40	400	200	300	200	horizontal
100 AF N	fixed	50	50	50	50	50	400	200	300	200	horizontal
100 AF N	fixed	60	60	60	60	60	400	200	300	200	horizontal
100 AF N	fixed	75	75	75	75	75	400	200	300	200	horizontal
100 AF N	fixed	100	100	100	97	94	400	200	300	200	horizontal
TD 100 N/H/L	fixed	16	16	16	16	16	400	200	300	200	horizontal
TD 100 N/H/L	fixed	20	20	20	20	20	400	200	300	200	horizontal
TD 100 N/H/L	fixed	25	25	25	25	25	400	200	300	200	horizontal
TD 100 N/H/L	fixed	32	32	32	32	32	400	200	300	200	horizontal
TD 100 N/H/L	fixed	40	40	40	40	40	400	200	300	200	horizontal
TD 100 N/H/L	fixed	50	50	50	50	50	400	200	300	200	horizontal
TD 100 N/H/L	fixed	63	63	63	63	63	400	200	300	200	horizontal
TD 100 N/H/L	fixed	80	80	80	80	80	400	200	300	200	horizontal
TD 100 N/H/L	fixed	100	100	100	100	100	400	200	300	200	horizontal
TS 100 N/H/L	fixed	40	40	40	40	40	400	200	300	200	horizontal
TS 100 N/H/L	fixed	50	50	50	50	50	400	200	300	200	horizontal
TS 100 N/H/L	fixed	63	63	63	63	60	400	200	300	200	horizontal
TS 100 N/H/L	fixed	80	80	80	80	80	400	200	300	200	horizontal
TS 100 N/H/L	fixed	100	100	100	100	100	400	200	300	200	horizontal
125 AF S/H	fixed	15	15	15	15	15	400	200	300	200	horizontal
125 AF S/H	fixed	20	20	20	20	20	400	200	300	200	horizontal
125 AF S/H	fixed	30	30	30	30	30	400	200	300	200	horizontal
125 AF S/H	fixed	40	40	40	40	40	400	200	300	200	horizontal
125 AF S/H	fixed	50	50	50	50	50	400	200	300	200	horizontal
125 AF S/H	fixed	60	60	60	60	60	400	200	300	200	horizontal
125 AF S/H	fixed	75	75	75	75	75	400	200	300	200	horizontal
125 AF S/H	fixed	100	100	100	95	90	400	200	300	200	horizontal
125 AF S/H	fixed	125	120	110	110	100	400	200	300	200	horizontal

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – LS ELECTRIC, part 2

Brand	LS ELECTRIC							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 460 V AC			at 460 V AC		at 460 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
30 AF S	1	10	50	12 x 5	10	–	10	50
30 AF S	1	10	50	12 x 5	10	–	10	50
30 AF S	1.5	10	50	12 x 5	10	–	10	50
30 AF S	2.5	14	50	12 x 5	14	–	14	50
30 AF S	2.5	14	50	12 x 5	14	–	14	50
30 AF S	6	14	50	12 x 5	14	–	14	50
50 AF N/S/H	2.5	14	50	12 x 5	14/18/50	–	14	50
50 AF N/S/H	2.5	14	50	12 x 5	14/18/50	–	14	50
50 AF N/S/H	6	14	50	12 x 5	14/18/50	–	14	50
50 AF N/S/H	10	14	50	12 x 5	14/18/50	–	14	50
50 AF N/S/H	10	14	50	12 x 5	14/18/50	–	14	50
60 AF N/S	2.5	14	50	12 x 5	14/18	–	14	50
60 AF N/S	2.5	14	50	12 x 5	14/18	–	14	50
60 AF N/S	6	14	50	12 x 5	14/18	–	14	50
60 AF N/S	10	14	50	12 x 5	14/18	–	14	50
60 AF N/S	10	14	50	12 x 5	14/18	–	14	50
60 AF N/S	16	14	50	15 x 5	14/18	6 x 15.5 x 0.8	14	50
100 AF N	2.5	18	50	12 x 5	18	–	18	50
100 AF N	2.5	18	50	12 x 5	18	–	18	50
100 AF N	6	18	50	12 x 5	18	–	18	50
100 AF N	10	18	50	12 x 5	18	–	18	50
100 AF N	10	18	50	12 x 5	18	–	18	50
100 AF N	16	18	50	15 x 5	18	6 x 15.5 x 0.8	18	50
100 AF N	25	18	50	15 x 5	18	6 x 15.5 x 0.8	18	50
100 AF N	35	18	50	15 x 5	18	6 x 15.5 x 0.8	18	50
TD 100 N/H/L	2.5	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	2.5	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	4	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	6	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	10	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	10	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	16	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	25	50	35	15 x 5	50/70/100	5 x 20 x 1	50	35
TD 100 N/H/L	35	50	35	15 x 5	30/50/65	5 x 20 x 1	50	35
TS 100 N/H/L	10	100	35	15 x 5	42/65/85	5 x 20 x 1	100	35
TS 100 N/H/L	10	100	35	15 x 5	42/65/85	5 x 20 x 1	100	35
TS 100 N/H/L	16	100	35	15 x 5	42/65/85	5 x 20 x 1	100	35
TS 100 N/H/L	25	100	35	15 x 5	42/65/85	5 x 20 x 1	100	35
TS 100 N/H/L	35	100	35	15 x 5	42/65/85	5 x 20 x 1	100	35
125 AF S/H	2.5	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	2.5	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	6	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	10	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	10	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	16	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	25	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	35	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100
125 AF S/H	50	37	100	15 x 5	37/50	6 x 15.5 x 0.8	37	100

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – LS ELECTRIC, part 3

Brand	LS ELECTRIC											
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]					
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
TD 160 N/H/L	fixed	100	100	100	100	100	600	200	300	200	horizontal
TD 160 N/H/L	fixed	125	125	125	125	125	600	200	300	200	horizontal
TD 160 N/H/L	fixed	160	160	150	155	144	600	200	300	200	horizontal
TS 160 N/H/L	fixed	100	100	100	100	100	600	200	300	200	horizontal
TS 160 N/H/L	fixed	125	125	125	125	115	600	200	300	200	horizontal
TS 160 N/H/L	fixed	160	160	140	150	125	600	200	300	200	horizontal
250 AF N/S/H	fixed	100	100	100	100	100	600	300	400	300	horizontal
250 AF N/S/H	fixed	125	125	125	125	125	600	300	400	300	horizontal
250 AF N/S/H	fixed	150	150	150	150	150	600	300	400	300	horizontal
250 AF N/S/H	fixed	175	175	175	175	170	600	300	400	300	horizontal
250 AF N/S/H	fixed	200	200	200	190	180	600	300	400	300	horizontal
250 AF N/S/H	fixed	225	225	220	210	200	600	300	400	300	horizontal
250 AF N/S/H	fixed	250	250	230	240	200	600	300	600	300	horizontal
TS 250 N/H/L	fixed	125	125	125	125	115	600	200	300	200	horizontal
TS 250 N/H/L	fixed	160	160	145	150	125	600	200	300	200	horizontal
TS 250 N/H/L	fixed	200	175	160	160	140	600	200	300	200	horizontal
TS 250 N/H/L	fixed	250	250	230	240	200	600	200	600	200	horizontal
TS 400 N/H/L	fixed	300	300	300	300	300	600	200	600	300	horizontal
TS 400 N/H/L	fixed	400	390	390	390	390	600	200	600	300	horizontal
400 AF N/S/H/L	fixed	250	250	250	250	250	600	300	600	400	horizontal
400 AF N/S/H/L	fixed	300	300	284	300	280	600	300	600	400	horizontal
400 AF N/S/H/L	fixed	350	350	350	350	350	600	300	600	400	horizontal
400 AF N/S/H/L	fixed	400	400	400	400	300	600	300	600	400	horizontal
TS 630 N/H/L	fixed	500	420	420	420	420	600	200	600	300	horizontal
TS 630 N/H/L	fixed	630	470	470	470	470	600	200	600	300	horizontal
TS 800 N/H/L	fixed	800	800	700	780	670	600	600	600	600	vertical
800 AF N/S/H/L	fixed	500	500	500	500	500	600	600	600	600	vertical
800 AF N/S/H/L	fixed	630	630	630	630	630	600	600	600	600	vertical
800 AF N/S/H/L	fixed	700	700	700	700	700	600	600	600	600	vertical
800 AF N/S/H/L	fixed	800	800	710	800	720	600	600	600	600	vertical
TS 1000 N/H/L	fixed	1000	1000	1000	1000	1000	600	800	600	800	vertical
1000 AF S/L	fixed	1000	1000	950	1000	960	600	–	–	–	vertical
1200 AF S/L	fixed	1200	1110	985	1095	985	600	–	–	–	vertical
TS 1250 N/H	fixed	1250	1250	1190	1340	1200	600	800	600	800	vertical
TS 1600 N/H	fixed	1600	1350	1190	1340	1200	600	800	600	800	vertical

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – LS ELECTRIC, part 4

Brand	LS ELECTRIC							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	Maximum distance from first support[3]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2]	
		at 460 V AC			at 460 V AC		at 460 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
TD 160 N/H/L	35	50	35	15 x 5	30/50/65	5 x 20 x 1	50	35
TD 160 N/H/L	50	50	35	15 x 5	30/50/65	5 x 20 x 1	50	35
TD 160 N/H/L	70	50	35	15 x 5	30/50/65	5 x 20 x 1	50	35
TS 160 N/H/L	35	100	35	15 x 5	42/65/85	5 x 24 x 1	50	35
TS 160 N/H/L	50	100	35	15 x 5	42/65/85	5 x 24 x 1	50	35
TS 160 N/H/L	70	100	35	15 x 5	42/65/85	5 x 24 x 1	50	35
250 AF N/S/H	35	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	50	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	50	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	70	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	95	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	95	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
250 AF N/S/H	120	26	100	25 x 5	26/37/50	5 x 24 x 1	26	100
TS 250 N/H/L	50	100	35	25 x 5	50/70/100	5 x 24 x 1	50	35
TS 250 N/H/L	70	100	35	25 x 5	50/70/100	5 x 24 x 1	50	35
TS 250 N/H/L	95	100	35	25 x 5	50/70/100	5 x 24 x 1	50	35
TS 250 N/H/L	120	100	35	25 x 5	50/70/100	5 x 24 x 1	50	35
TS 400 N/H/L	185	100	60	25 x 5	65/85/100	5 x 32 x 1	65	60
TS 400 N/H/L	240	100	60	25 x 5	65/85/100	5 x 32 x 1	65	60
400 AF N/S/H/L	120	37	100	30 x 5	37/50/65/85	10 x 24 x 1	37	100
400 AF N/S/H/L	185	37	100	30 x 5	37/50/65/85	10 x 24 x 1	37	100
400 AF N/S/H/L	185	37	100	30 x 5	37/50/65/85	10 x 24 x 1	37	100
400 AF N/S/H/L	240	37	100	30 x 5	37/50/65/85	10 x 24 x 1	37	100
TS 630 N/H/L	240	100	60	1 x 30 x 10	65/85/100	10 x 32 x 1	65	60
TS 630 N/H/L	370	100	60	1 x 30 x 10	65/85/100	10 x 32 x 1	65	60
TS 800 N/H/L	2 x 240	100	100	1 x 50 x 10	65/100/100	10 x 50 x 1	65	100
800 AF N/S/H/L	2 x 150	37	100	30 x 10	37/65/85	10 x 32 x 1	37	100
800 AF N/S/H/L	2 x 185	37	100	30 x 10	37/65/85	10 x 32 x 1	37	100
800 AF N/S/H/L	2 x 240	37	100	30 x 10	37/65/85	10 x 32 x 1	37	100
800 AF N/S/H/L	2 x 240	37	100	30 x 10	37/65/85	10 x 32 x 1	37	100
TS 1000 N/H/L	–	100	–	2 x 50 x 10	50/65/100	–	50/65/100	–
1000 AF S/L	–	100	–	2 x 45 x 9	65/85	10 x 50 x 1	65/85	100
1200 AF S/L	–	100	–	2 x 45 x 9	65/85	2 x 10 x 50 x 1	65/85	100
TS 1250 N/H	–	100	–	2 x 50 x 10	50/65	2 x 50 x 10	50/65	–
TS 1600 N/H	–	100	–	2 x 60 x 10	50/65	2 x 50 x 10	50/65	–

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 54: Rated operating currents I_{ng} for moulded-case circuit-breakers – Mitsubishi, part 1

Brand	Mitsubishi										
Type	Size	In Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
NF32-SW	1	3	3	3	3	3	400	150	400	150	horizontal
NF32-SW	1	4	4	3	4	3	400	150	400	150	horizontal
NF32-SW	1	6	6	5	5	5	400	150	400	150	horizontal
NF32-SW	1	10	9	9	9	9	400	150	400	150	horizontal
NF32-SW	1	16	14	14	14	14	400	150	400	150	horizontal
NF32-SW	1	20	18	17	18	17	400	150	400	150	horizontal
NF32-SW	1	25	23	22	23	22	400	150	400	150	horizontal
NF32-SW	1	32	29	28	29	28	400	150	400	150	horizontal
NF63	1	3	3	3	3	3	400	150	400	200	horizontal
NF63	1	4	4	3	4	3	400	150	400	200	horizontal
NF63	1	6	5	5	5	5	400	150	400	200	horizontal
NF63	1	10	9	9	9	9	400	150	400	200	horizontal
NF63	1	16	14	14	14	14	400	150	400	200	horizontal
NF63	1	20	18	17	18	17	400	150	400	200	horizontal
NF63	1	25	23	22	23	22	400	150	400	200	horizontal
NF63	1	32	29	28	29	28	400	150	400	200	horizontal
NF63	1	40	36	35	36	35	400	150	400	200	horizontal
NF63	1	50	45	44	45	44	400	150	400	200	horizontal
NF63	1	63	57	55	57	55	400	150	400	200	horizontal
NF125-HGW RE	2	32	29	28	29	28	400	150	400	200	horizontal
NF125-HGW RE	2	63	57	55	57	55	400	150	400	200	horizontal
NF125-HGW RE	2	100	90	87	90	87	400	150	400	200	horizontal
NF125-HGW RE	2	125	113	109	113	109	400	150	400	200	horizontal
NF125-HGW RT	2	25	23	22	23	22	400	150	400	200	horizontal
NF125-HGW RT	2	40	36	35	36	35	400	150	400	200	horizontal
NF125-HGW RT	2	63	57	55	57	55	400	150	400	200	horizontal
NF125-HGW RT	2	100	90	87	90	87	400	150	400	200	horizontal
NF125-HGW RT	2	125	113	109	113	109	400	150	400	200	horizontal
NF125-RGW RT	2	25	23	22	23	22	600	150	600	200	horizontal
NF125-RGW RT	2	40	36	35	36	35	600	150	600	200	horizontal
NF125-RGW RT	2	63	57	55	57	55	600	150	600	200	horizontal
NF125-RGW RT	2	100	90	87	90	87	600	150	600	200	horizontal
NF125-SGW RE	2	32	29	28	29	28	400	150	400	200	horizontal
NF125-SGW RE	2	63	57	55	57	55	400	150	400	200	horizontal
NF125-SGW RE	2	100	90	87	90	87	400	150	400	200	horizontal
NF125-SGW RE	2	125	113	109	113	109	400	150	400	200	horizontal
NF125-SGW RT	2	25	23	22	23	22	400	150	400	200	horizontal
NF125-SGW RT	2	40	36	35	36	35	400	150	400	200	horizontal
NF125-SGW RT	2	63	57	55	57	55	400	150	400	200	horizontal
NF125-SGW RT	2	100	90	87	90	87	400	150	400	200	horizontal
NF125-SGW RT	2	125	113	109	113	109	400	150	400	200	horizontal
NF125-UGW RT	2	25	23	22	23	22	400	150	400	200	horizontal
NF125-UGW RT	2	40	36	35	36	35	400	150	400	200	horizontal
NF125-UGW RT	2	63	57	55	57	55	400	150	400	200	horizontal
NF125-UGW RT	2	100	90	87	90	87	400	150	400	200	horizontal

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Mitsubishi, part 2

Brand	Mitsubishi							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
NF32-SW	2.5	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	2.5	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	2.5	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	2.5	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	4	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	4	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	6	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF32-SW	6	5	120	1 x 12 x 5	5	6 x 9 x 0.8	5	200
NF63	2.5	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	2.5	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	2.5	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	2.5	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	4	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	4	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	6	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	6	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	10	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	10	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF63	16	10	120	1 x 12 x 5	10	6 x 9 x 0.8	10	200
NF125-HGW RE	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RE	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RE	35	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RE	50	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RT	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RT	10	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RT	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RT	35	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-HGW RT	50	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-RGW RT	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-RGW RT	10	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-RGW RT	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-RGW RT	50	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RE	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RE	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RE	35	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RE	50	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RT	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RT	10	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RT	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RT	35	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-SGW RT	50	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-UGW RT	6	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-UGW RT	10	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-UGW RT	16	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF125-UGW RT	35	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating current I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Mitsubishi, part 3

Brand	Mitsubishi										
Type	Size	In Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
NF160-HGW RE	2	160	144	139	144	139	400	150	400	200	horizontal
NF160-HGW RT	2	160	144	139	144	139	400	150	400	200	horizontal
NF160-SGW RE	2	160	144	139	144	139	400	150	400	200	horizontal
NF160-SGW RT	2	160	144	139	144	139	400	150	400	200	horizontal
NF250-HGW RE	2	250	228	196	228	218	600	150	600	200	horizontal
NF250-SGW RE	2	160	144	139	144	139	400	150	400	200	horizontal
NF250-SGW RE	2	250	228	218	228	218	600	150	600	200	horizontal
NF250-SGW RT	2	160	144	139	144	139	400	150	400	200	horizontal
NF250-SGW RT	2	250	228	218	228	218	600	150	600	200	horizontal
NF250-RGW RT	3	160	144	139	144	139	400	150	400	200	horizontal
NF250-RGW RT	3	225	205	196	205	196	400	150	400	200	horizontal
NF250-UGW RT	3	160	144	139	144	139	400	150	400	200	horizontal
NF250-UGW RT	3	225	205	196	205	196	400	150	400	200	horizontal
NF400-HEW	4	400	368	356	368	356	600	300	600	400	horizontal
NF400-REW	4	400	368	356	368	356	600	300	600	400	horizontal
NF400-SEW	4	400	368	356	368	356	600	300	600	400	horizontal
NF400-UEW	4	400	368	356	368	356	600	600	800	400	horizontal
NF630....	5	630	567	504	567	504	600	600	600	600	horizontal
NF800-UEW	6	800	720	640	640	640	600	800	600	800	vertical
NF1000-SEW	7	1000	900	800	800	800	600	800	600	800	vertical
NF1250-SEW	7	1250	1125	1000	1000	1000	600	800	600	800	vertical
NF1600-SEW	7	1600	1440	1280	1440	1280	600	800	600	800	vertical

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Mitsubishi, part 4

Brand	Mitsubishi							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support3)
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	Maximum distance from first support3)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
NF160-HGW RE	95	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF160-HGW RT	95	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF160-SGW RE	95	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF160-SGW RT	95	50	120	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
NF250-HGW RE	150	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-SGW RE	95	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-SGW RE	150	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-SGW RT	95	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-SGW RT	150	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-RGW RT	95	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-RGW RT	150	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-UGW RT	95	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF250-UGW RT	150	50	120	1 x 20 x 5	50	5 x 24 x 1	50	200
NF400-HEW	2 x 150	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NF400-REW	2 x 150	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NF400-SEW	2 x 150	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NF400-UEW	2 x 150	50	200	1 x 40 x 10	50	10 x 32 x 1.0	50	200
NF630....	2 x 185 4)	50	200	1 x 40 x 10	50	10 x 32 x 1.0	50	200
NF800-UEW	3 x 185 4)	50	200	1 x 40 x 10	50	1 x 10 x 40 x 1.0	40	200
NF1000-SEW	4 x 150 4)	50	200	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	200
NF1250-SEW	4 x 240 4)	50	200	2 x 50 x 10	50	2 x 10 x 50 x 1.0	40	200
NF1600-SEW	–	–	–	3 x 60 x 10	50	–	–	200

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 55: Rated operating currents I_{ng} for moulded-case circuit-breakers – Schneider Electric, part 1

Brand	Schneider Electric										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
NSX100	2	16	16	16	16	16	400	150	400	200	horizontal
NSX100	2	25	25	25	25	25	400	150	400	200	horizontal
NSX100	2	32	32	32	32	32	400	150	400	200	horizontal
NSX100	2	40	40	40	40	40	400	150	400	200	horizontal
NSX100	2	50	50	50	50	50	400	150	400	200	horizontal
NSX100	2	63	63	63	63	63	400	150	400	200	horizontal
NSX100	2	80	80	80	80	80	400	150	400	200	horizontal
NSX100	2	100	100	100	100	100	400	150	400	200	horizontal
NSX160	2	80	80	80	80	80	400	150	400	200	horizontal
NSX160	2	100	100	100	100	100	400	150	400	200	horizontal
NSX160	2	125	125	125	125	125	400	150	400	200	horizontal
NSX160	2	160	160	160	160	154	400	150	400	200	horizontal
NSX250	2	125	125	125	125	125	400	200	400	200	horizontal
NSX250	2	160	160	160	160	150	400	200	400	200	horizontal
NSX250	2	200	200	200	200	185	400	200	400	200	horizontal
NSX250	2	250	250	230	250	210	400	200	600	200	horizontal
NSX400	3	320	320	305	320	285	600	200	600	300	horizontal
NSX400	3	400	400	350	400	330	600	300	600	300	horizontal
NSX630	3	500	500	450	500	410	600	300	600	300	horizontal
NSX630	3	630	630	510	630	475	600	300	600	300	horizontal
NSX400	3	400	400	350	400	330	600	600	600	600	horizontal
NSX630	3	630	630	510	630	475	600	600	600	600	horizontal
NS630b	4	630	630	630	630	630	600	600	600	600	vertical
NS800	4	800	800	800	800	800	600	600	600	600	vertical
NS1000	4	1000	1000	1000	1000	1000	600	600	600	600	vertical
NS1250	4	1250	1250	1230	1250	1220	600	600	600	600	vertical
NS1600	4	1600	1540	1370	1500	1220	600	600	600	600	vertical

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating current I_{ng} for moulded-case circuit-breakers MCCB

Rated operating current I_{ng} for moulded-case circuit-breakers – Schneider ELECTRIC, part 2

Brand	Schneider Electric							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm^2	kA	mm	mm^2	kA	mm^2	kA	mm
NSX100	4	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	6	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	6	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	10	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	10	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	16	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	25	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX100	50	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX160	35	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX160	50	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX160	70	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX160	95	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX250	70	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX250	95	50	200	1 x 15 x 5	50	10 x 15.5 x 0.8	50	200
NSX250	120	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
NSX250	150	50	200	1 x 25 x 5	50	10 x 15.5 x 0.8	50	200
NSX400	2 x 150[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NSX400	2 x 150[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NSX630	2 x 185[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NSX630	2 x 185[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NSX400	2 x 150[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NSX630	2 x 185[4)]	50	200	1 x 30 x 10	50	10 x 32 x 1.0	50	200
NS630b	2 x 185[4)]	50	400	1 x 50 x 10	50	–	–	300
NS800	3 x 185[4)]	50	400	1 x 50 x 10	50	–	–	300
NS1000	4 x 150[4)]	50	400	2 x 50 x 10	50	–	–	300
NS1250	4 x 240[4)]	50	400	2 x 50 x 10	50	–	–	300
NS1600	–	50	400	2 x 60 x 10	50	–	–	300

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 56: Rated operating currents I_{ng} for moulded-case circuit-breakers – Siemens, part 1

Brand	Siemens										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
3 VA 10	–	16	16	16	16	16	400	150	400	150	horizontal
3 VA 10	–	25	25	25	25	25	400	150	400	150	horizontal
3 VA 10	–	32	32	32	32	32	400	150	400	150	horizontal
3 VA 10	–	40	40	40	40	40	400	150	400	150	horizontal
3 VA 10	–	50	50	50	50	50	400	150	400	150	horizontal
3 VA 10	–	63	63	63	63	63	400	150	400	150	horizontal
3 VA 10	–	80	80	80	80	80	400	150	400	150	horizontal
3 VA 10	–	100	100	100	100	100	400	150	400	150	horizontal
3 VA 11	–	16	16	16	16	16	400	150	400	150	horizontal
3 VA 11	–	20	20	20	20	20	400	150	400	150	horizontal
3 VA 11	–	25	25	25	25	25	400	150	400	150	horizontal
3 VA 11	–	32	32	32	32	32	400	150	400	150	horizontal
3 VA 11	–	40	40	40	40	40	400	150	400	150	horizontal
3 VA 11	–	50	50	50	50	50	400	150	400	150	horizontal
3 VA 11	–	63	63	63	63	59	400	150	400	150	horizontal
3 VA 11	–	80	80	80	80	76	400	150	400	150	horizontal
3 VA 11	–	100	100	100	100	89	400	150	400	150	horizontal
3 VA 11	–	125	125	121	125	104	400	150	400	150	horizontal
3 VA 11	–	160	160	145	160	125	400	150	400	150	horizontal
3 VA 12	–	160	160	160	160	160	400	200	400	200	horizontal
3 VA 12	–	200	200	200	200	200	400	200	400	200	horizontal
3 VA 12	–	250	232	232	232	228	400	200	400	200	horizontal
3 VA 13	–	320	320	315	320	290	600	300	600	300	horizontal
3 VA 13	–	400	400	365	400	335	600	300	600	300	horizontal
3 VA 14	–	500	500	460	500	420	600	300	600	300	horizontal
3 VA 14	–	630	630	520	630	480	600	300	600	300	horizontal
3 VA 20	–	25	25	25	25	25	400	200	400	200	horizontal
3 VA 20	–	40	40	40	40	40	400	200	400	200	horizontal
3 VA 20	–	63	63	63	63	63	400	200	400	200	horizontal
3 VA 20	–	100	100	100	100	100	400	200	400	200	horizontal
3 VA 21	–	25	25	25	25	25	400	200	400	200	horizontal
3 VA 21	–	40	40	40	40	40	400	200	400	200	horizontal
3 VA 21	–	63	63	63	63	63	400	200	400	200	horizontal
3 VA 21	–	100	100	100	100	100	400	200	400	200	horizontal
3 VA 21	–	160	155	155	155	145	400	200	400	200	horizontal
3 VA 22	–	160	160	160	160	160	400	200	400	200	horizontal
3 VA 22	–	250	250	250	250	245	400	200	400	200	horizontal
3 VA 23	–	250	250	250	250	250	600	300	600	300	horizontal
3 VA 23	–	400	400	400	400	390	600	300	600	300	horizontal
3 VA 24	–	400	400	400	400	400	600	300	600	300	horizontal
3 VA 24	–	500	500	500	500	500	600	300	600	300	horizontal
3 VA 24	–	630	570	560	570	540	600	300	600	300	horizontal
3 VA 25	–	630	630	630	630	630	600	300	600	300	vertical
3 VA 25	–	800	760	740	760	680	600	300	600	300	vertical
3 VA 25	–	1000	1000	980	1000	900	600	300	600	300	vertical
3 VA 27	–	800	800	770	800	690	600	2000	–	–	vertical
3 VA 27	–	1000	1000	910	1000	800	600	2000	–	–	vertikal
3 VA 27	–	1250	1200	910	1200	810	600	2000	–	–	vertical
3 VA 27	–	1600	1460	1100	1460	980	600	2000	–	–	vertical

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{cu}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Siemens, part 2

Brand	Siemens							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
3 VA 10	2.5	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	4	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	6	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	10	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	10	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	16	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	25	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 10	35	25	150	15 x 5	25	6 x 15.5 x 0.8	25	150
3 VA 11	2.5	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	2.5	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	4	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	6	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	10	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	10	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	16	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	25	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	35	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	50	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 11	70	55	150	15 x 5	55	6 x 15.5 x 0.8	55	150
3 VA 12	70	40	150	15 x 5	40	6 x 15.5 x 0.8	40	150
3 VA 12	95	40	150	15 x 5	40	10 x 15.5 x 0.8	40	150
3 VA 12	150	40	150	25 x 5	40	10 x 15.5 x 0.8	40	150
3 VA 13	240	70	100	30 x 10	70	10 x 24.0 x 1.0	70	100
3 VA 13	240	70	100	30 x 10	70	10 x 24.0 x 1.0	70	100
3 VA 14	2 x 150	70	100	30 x 10	70	10 x 24.0 x 1.0	70	100
3 VA 14	2 x 185	70	100	30 x 10	70	10 x 24.0 x 1.0	70	100
3 VA 20	4	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 20	10	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 20	16	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 20	35	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 21	4	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 21	10	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 21	16	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 21	35	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 21	70	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 22	70	100	80	25 x 5	100	6 x 15.5 x 0.8	100	80
3 VA 22	120	100	80	25 x 5	100	10 x 15.5 x 0.8	100	80
3 VA 23	120	100	100	25 x 5	100	10 x 15.5 x 0.8	100	100
3 VA 23	240	100	100	30 x 10	100	10 x 24 x 1.0	100	100
3 VA 24	240	100	100	30 x 10	100	10 x 24 x 1.0	100	100
3 VA 24	2 x 150	100	100	30 x 10	100	2 x 10 x 24 x 1	100	100
3 VA 24	2 x 185	100	100	30 x 10	100	2 x 10 x 24 x 1	100	100
3 VA 25	2 x 185	–	–	30 x 10	–	10 x 50 x 1	100	–
3 VA 25	2 x 240	–	–	50 x 10	–	10 x 50 x 1	100	–
3 VA 25	–	50	–	2 x 50 x 10	100	10 x 50 x 2	50	–
3 VA 27	–	50	–	–	–	–	50	–
3 VA 27	–	50	–	–	–	–	50	–
3 VA 27	–	50	–	–	–	–	50	–
3 VA 27	–	50	–	–	–	–	50	–

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – GE, part 3

Brand	Siemens										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1)]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
VL160X	1	16	14	14	14	14	400	200	400	200	horizontal
VL160X	1	20	18	17	18	17	400	200	400	200	horizontal
VL160X	1	25	23	22	23	22	400	200	400	200	horizontal
VL160X	1	32	29	28	29	28	400	200	400	200	horizontal
VL160X	1	40	36	35	36	35	400	200	400	200	horizontal
VL160X	1	50	45	44	45	44	400	200	400	200	horizontal
VL160X	1	63	57	55	57	55	400	200	400	200	horizontal
VL160X	1	80	72	70	72	70	400	200	400	200	horizontal
VL160X	1	100	90	87	90	87	400	200	400	200	horizontal
VL160X	1	125	113	109	113	109	400	200	400	200	horizontal
VL160X	1	160	144	139	144	139	400	200	400	200	horizontal
VL160	2	20	18	17	18	17	400	200	400	200	horizontal
VL160	2	25	23	22	23	22	400	200	400	200	horizontal
VL160	2	32	29	28	29	28	400	200	400	200	horizontal
VL160	2	40	36	35	36	35	400	200	400	200	horizontal
VL160	2	50	45	44	45	44	400	200	400	200	horizontal
VL160	2	63	57	55	57	55	400	200	400	200	horizontal
VL160	2	80	72	70	72	70	400	200	400	200	horizontal
VL160	2	100	90	87	90	87	400	200	400	200	horizontal
VL160	2	125	113	109	113	109	400	200	400	200	horizontal
VL160	2	160	144	139	144	139	400	200	400	200	horizontal
VL250	3	80	72	70	72	70	400	200	400	200	horizontal
VL250	3	100	90	87	90	87	400	200	400	200	horizontal
VL250	3	125	113	109	113	109	400	200	400	200	horizontal
VL250	3	160	144	139	144	139	400	200	400	200	horizontal
VL250	3	200	182	174	182	174	400	200	400	200	horizontal
VL250	3	250	228	218	228	218	600	200	600	200	horizontal
VL400	4	160	144	139	144	139	600	200	600	300	horizontal
VL400	4	200	182	174	182	174	600	200	600	300	horizontal
VL400	4	250	228	218	228	218	600	200	600	300	horizontal
VL400	4	315	287	274	287	274	600	200	600	300	horizontal
VL400	4	400	368	356	368	356	600	200	600	300	horizontal
VL630	5	250	228	218	228	218	600	300	600	300	horizontal
VL630	5	315	287	274	287	274	600	300	600	300	horizontal
VL630	5	400	368	356	368	356	600	300	600	300	horizontal
VL630	5	500	450	400	450	400	600	300	600	300	horizontal
VL630	5	630	567	504	567	504	600	300	600	300	horizontal
VL630	5	250	228	218	228	218	600	300	600	300	vertical
VL630	5	315	287	274	287	274	600	300	600	300	vertical
VL630	5	400	368	356	368	356	600	300	600	300	vertical
VL630	5	500	450	400	450	400	600	300	600	300	vertical
VL630	5	630	567	504	567	504	600	300	600	300	vertical
VL800	6	800	780	710	740	640	600	600	600	600	vertical
VL1250	7	1000	900	900	900	710	600	600	600	600	vertical
VL1250	7	1250	1125	1100	1100	890	600	600	600	600	vertical
VL1600	8	1600	1600	1600	1600	1300	600	800	600	800	vertikal

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating current I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Siemens, part 4

Brand	Siemens							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support3)
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	Maximum distance from first support3)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc} 2)	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
VL160X	4	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	4	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	6	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	6	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	10	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	10	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	16	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	25	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	35	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	70	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160X	95	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160	4	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	250
VL160	6	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	6	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	10	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	10	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	16	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	25	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	35	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	70	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL160	95	50	100	1 x 15 x 5	50	6 x 9 x 0.8	50	400
VL250	25	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL250	35	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL250	50	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL250	95	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL250	120	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL250	185	50	130	1 x 15 x 5	50	10 x 15.5 x 0.8	50	400
VL400	95	50	150	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL400	120	50	150	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL400	185	50	150	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL400	240	50	150	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL400	240	50	150	1 x 30 x 10	50	10 x 24 x 1.0	50	400
VL630	240	50	300	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL630	240	50	300	1 x 30 x 5	50	10 x 32 x 1.0	50	400
VL630	2 x 150 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL630	2 x 185 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL630	2 x 185 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL630	240	50	300	1 x 30 x 5	50	10 x 24 x 1.0	50	400
VL630	240	50	300	1 x 30 x 5	50	10 x 32 x 1.0	50	400
VL630	2 x 150 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL630	2 x 185 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL630	2 x 185 4)	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	400
VL800	3 x 185 4)	50	300	2 x 40 x 10	50	2 x 10 x 40 x 1.0	50	400
VL1250	4 x 150 4)	50	300	2 x 50 x 10	50	2 x 10 x 50 x 1.0	50	400
VL1250	4 x 240 4)	50	300	2 x 50 x 10	50	2 x 10 x 50 x 1.0	50	400
VL1600	–	–	300	3 x 60 x 10	50	–	50	400

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

VX25 Ri4Power

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Table 57: Rated operating currents I_{ng} for moulded-case circuit-breakers – Terasaki, part 1

Brand	Terasaki										
Type	Size	I_n Circuit-breaker	Rated operating current I_{ng} with consideration of protection category and cooling				Minimum compartment dimensions[1]				
			vent.		vent.		3-pole version		4-pole version		Installation position
			IP2X	IP2X	IP54	IP54	Width	Height	Width	Height	
MCCB		A	A	A	A	A	mm	mm	mm	mm	
S125	1	20	18	17	18	17	400	150	400	200	horizontal
S125	1	32	29	28	29	28	400	150	400	200	horizontal
S125	1	50	45	44	45	44	400	150	400	200	horizontal
S125	1	63	57	55	57	55	400	150	400	200	horizontal
S125	1	100	90	87	90	87	400	150	400	200	horizontal
S125	1	125	113	109	113	109	400	150	400	200	horizontal
S160	2	20	18	17	18	17	400	200	400	300	horizontal
S160	2	32	29	28	29	28	400	200	400	300	horizontal
S160	2	50	45	44	45	44	400	200	400	300	horizontal
S160	2	63	57	55	57	55	400	200	400	300	horizontal
S160	2	100	90	87	90	87	400	200	400	300	horizontal
S160	2	125	113	109	113	109	400	200	400	300	horizontal
S160	2	160	144	139	144	139	400	200	400	300	horizontal
S250 NJ/GJ	2	160	144	139	144	139	400	200	400	200	horizontal
S250 NJ/GJ	2	200	182	174	182	174	400	200	400	200	horizontal
S250 NJ/GJ	2	250	228	218	228	218	600	200	600	200	horizontal
H/L125	3	20	18	17	18	17	400	200	400	300	horizontal
H/L125	3	32	29	28	29	28	400	200	400	300	horizontal
H/L125	3	50	45	44	45	44	400	200	400	300	horizontal
H/L125	3	63	57	55	57	55	400	200	400	300	horizontal
H/L125	3	100	90	87	90	87	400	200	400	300	horizontal
H/L125	3	125	113	109	113	109	400	200	400	300	horizontal
H/L160	3	160	144	139	144	139	400	200	400	300	horizontal
S/H250	3	40	36	35	36	35	400	200	400	300	horizontal
S/H250	3	125	113	109	113	109	400	200	400	300	horizontal
S/H/L250	3	160	144	139	144	139	400	200	400	300	horizontal
S/H/L250	3	250	228	218	228	218	600	200	600	300	horizontal
H/L400	4	250	228	218	228	218	600	300	600	300	horizontal
H/L400	4	400	368	356	368	356	600	300	600	300	horizontal
E/S400	5	250	228	218	228	218	600	300	600	300	horizontal
E/S400	5	400	368	356	368	356	600	300	600	300	horizontal
E/S630	5	630	567	504	567	504	600	300	600	400	horizontal
H/L800	6	630	567	504	567	504	600	800	600	800	vertical
H/L800	6	800	640	640	640	640	600	800	600	800	vertikal

[1] The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
[2] Circuit-breakers must be selected with the required breaking capacity I_{CU}.
[3] For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
[4] Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

Rated operating currents I_{ng} for moulded-case circuit-breakers MCCB

Rated operating currents I_{ng} for moulded-case circuit-breakers – Terasaki, part 2

Brand	Terasaki							
Type	Connection with round conductor			Connection with copper bar		Connection with laminated copper bar		Maximum distance from first support[3)]
	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Maximum distance from first support[3)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	Minimum connection cross-section	Max. short-circuit withstand strength I_{cc}[2)]	
		at 400 V AC			at 400 V AC		at 400 V AC	
MCCB	mm²	kA	mm	mm²	kA	mm²	kA	mm
S125	4	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S125	6	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S125	10	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S125	16	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S125	35	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S125	50	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	4	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	6	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	10	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	16	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	35	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	50	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S160	95	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S250 NJ/GJ	95	50	200	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
S250 NJ/GJ	120	50	200	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
S250 NJ/GJ	120	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
H/L125	4	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L125	6	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L125	10	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L125	16	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L125	35	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L125	50	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
H/L160	95	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S/H250	6	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S/H250	50	50	200	1 x 15 x 5	50	4 x 15.5 x 0.8	50	200
S/H/L250	95	50	200	1 x 15 x 5	50	6 x 15.5 x 0.8	50	200
S/H/L250	120	50	200	1 x 20 x 5	50	10 x 15.5 x 0.8	50	200
H/L400	150[4)]	50	300	1 x 20 x 5	50	5 x 24 x 1.0	50	200
H/L400	2 x 120[4)]	50	300	1 x 20 x 10	50	10 x 24 x 1.0	50	200
E/S400	150[4)]	50	300	1 x 30 x 5	50	5 x 24 x 1.0	50	200
E/S400	2 x 120[4)]	50	300	1 x 30 x 10	50	10 x 24 x 1.0	50	200
E/S630	2 x 240[4)]	50	300	1 x 30 x 10	50	10 x 32 x 1.0	50	200
H/L800	2 x 185[4)]	50	300	1 x 40 x 10	50	1 x 10 x 40 x 1.0	50	200
H/L800	2 x 300[4)]	50	300	2 x 40 x 10	50	2 x 10 x 40 x 1.0	50	200

1) The minimum distances refer to U_n of 400 V VAC. At higher voltages, where necessary, greater minimum spacings between the devices and other conductive parts stipulated by the switchgear manufacturer must be taken into account. The use of phase divider panels or connection space covers should be designed in accordance with the switchgear manufacturer's specifications and may result in larger compartments.
2) Circuit-breakers must be selected with the required breaking capacity I_{cu}.
3) For laminated copper bars, the support has been tested with universal brackets 3079.000 and 3079.010 and should be used in accordance with the design rules. Solid copper bars must be supported with connection kit support 9660.205. Where necessary, lines and cables should be secured with the appropriate cable clamp components.
4) Use of cables and leads is only admissible on the outgoing side.

Note: The data given in this table is for an overview only! To determine current and exact data, a configuration must be carried out in Power Engineering (https://www.rittal.com/rpevx25/#/systemConfiguration).

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