

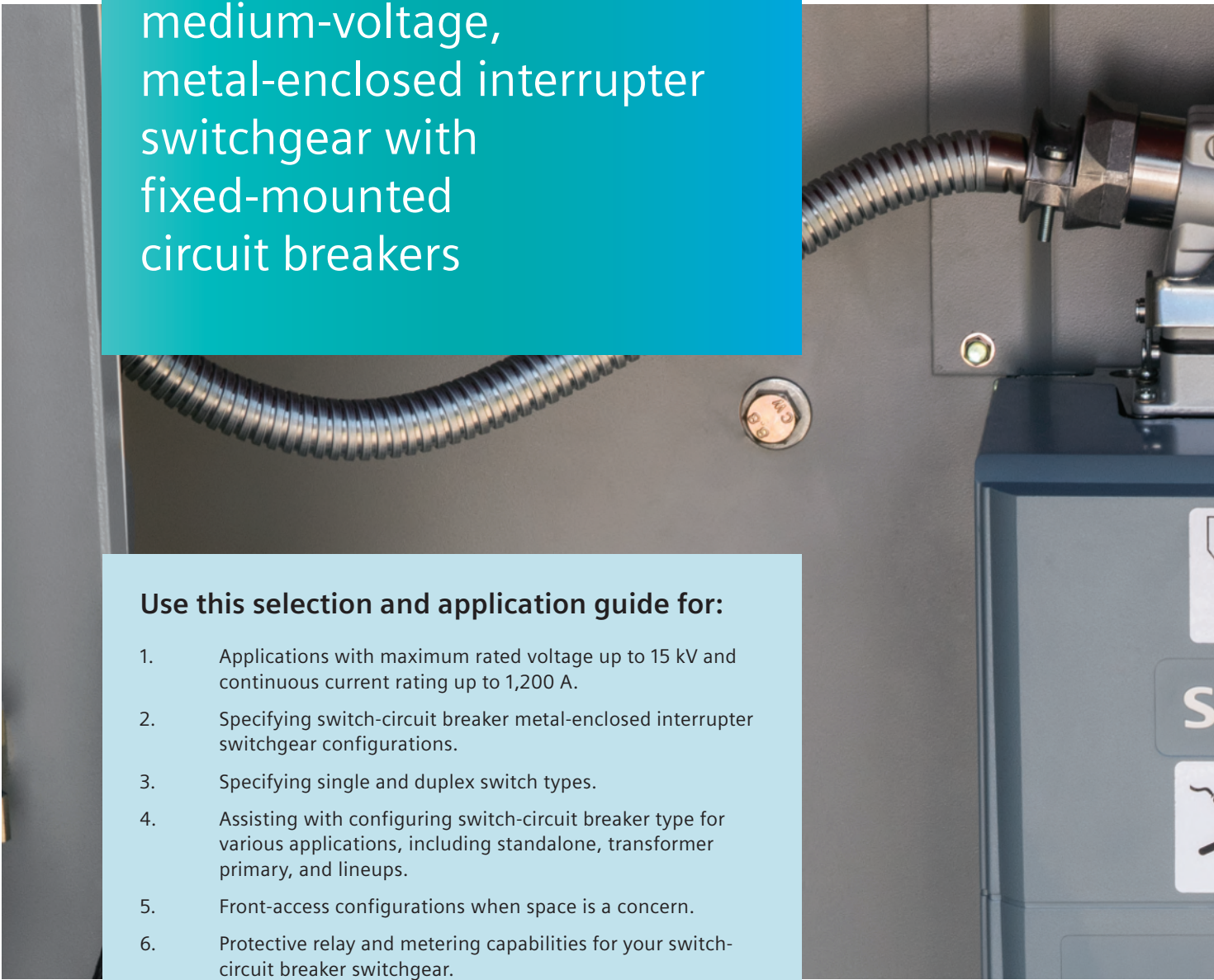
SIEMENS

Ingenuity for life

SIEBREAK-VCB™ switchgear

Metal-enclosed interrupter
5 kV-15 kV

usa.siemens.com/SIEBREAK



SIEBREAK-VCB™ medium-voltage, metal-enclosed interrupter switchgear with fixed-mounted circuit breakers

Use this selection and application guide for:

1. Applications with maximum rated voltage up to 15 kV and continuous current rating up to 1,200 A.
2. Specifying switch-circuit breaker metal-enclosed interrupter switchgear configurations.
3. Specifying single and duplex switch types.
4. Assisting with configuring switch-circuit breaker type for various applications, including standalone, transformer primary, and lineups.
5. Front-access configurations when space is a concern.
6. Protective relay and metering capabilities for your switch-circuit breaker switchgear.



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Overview

General

Siemens SIEBREAK-VCB™ load-interrupter switchgear is a modular assembly of switches, fixed-mounted vacuum circuit breakers, and bus assemblies that are fully integrated both mechanically and electrically to provide the highest level of medium-voltage circuit protection.

Siemens SIEBREAK, part of the metal-enclosed interrupter switchgear family, is a modular design consisting of a switch, fuses, and bus in an assembly that is fully integrated both mechanically and electrically to provide medium-voltage circuit protection. For more information on SIEBREAK, refer to EMMS-T40049-XX-4AUS

Applications:

- Standalone bay
- Transformer primary
- Lineups.

Features and benefits:

- 5 kV and 15 kV voltage classes
- 600 A and 1,200 A continuous current
- 25 kA and 40 kA fixed-mounted vacuum circuit breaker
- Siemens overcurrent protection relay
- Indoor type 1 enclosure
- Single and duplex switch-circuit breaker types
- Large 8" x 18" (203 mm x 457 mm) viewing window
- Hinged, grounded metal barrier in front of switch blades

- Phase barriers between switch poles
- 11-gauge doors, covers, and barriers
- Silver-plated copper bus
- Provisions for key interlocking
- Mechanical door and switch interlock
- Upper and lower ventilation louvers
- Glass-polyester bus supports
- Non-corrosive nameplate
- Space heater with thermostat
- NEMA CC1 hole patterns for cable termination
- Current transformers (CTs) - one per phase
- Can be intergated into a lineup of SIEBREAK fused load-interrupter switchgear.

Standard outdoor features:

- Bottom cover plate
- Externally removable filters
- 6" (152 mm) formed steel base.

Modular configurations to mount:

- Surge arresters
- Instrument transformers
- Control power transformers
- Power meters.

SIEBREAK-VCB medium-voltage metal-enclosed interrupter switchgear with fixed-mounted vacuum circuit breakers

Arc-flash mitigation

Suitable for application as a virtual secondary main circuit breaker, to allow reduction in arc-flash incident energy in the low-voltage switchgear for faults on the main bus (with no main circuit breaker) or faults on the line side of a main circuit breaker.

Optional:

- UL or C-UL Listing
- Indoor type 2 drip-proof enclosure
- Indoor type 12 dust-resistant enclosure
- Outdoor non-walk-in type 3R enclosure
- High-track resistance bus supports
- Auxiliary switches (2 NO-2 NC)
- Mimic bus
- Ground studs (ball stud) type
- Screens and filters (indoor)
- Tin-plated copper bus
- Second set of CTs.

Standards

SIEBREAK-VCB metal-enclosed interrupter switchgear meets or exceeds the requirements of the following standards:

- ANSI/IEEE C37.20.3
- ANSI/IEEE C37.20.4
- ANSI/IEEE C37.04
- ANSI C37.54
- ANSI C37.57
- ANSI C37.58
- CSA 22.2 No. 31 (for Canada)
- CSA 22.2 No. 58 (for Canada)
- CSA 22.2 No. 193 (for Canada).

SIEBREAK-VCB switchgear assemblies are listed with Underwriters Laboratories and, for use in Canada, have the C-UL listing certifying compliance with Canadian standards and codes.



Type SIEBREAK-VCB metal-enclosed interrupter switchgear

Construction

Type SIEBREAK-VCB metal-enclosed interrupter switchgear with front door opened



SIEBREAK-VCB metal-enclosed interrupter switchgear is of metal-enclosed construction as described in ANSI/IEEE standards. The equipment is tested and factory assembled in convenient shipping groups. It is ruggedly constructed of 11-gauge sheet steel including the doors. The assembly employs bolted construction.

SIEBREAK-VCB's modular design is available in many different enclosure types and bus configurations. The switch mechanism is arranged in the upper portion of the enclosure while the vacuum circuit breaker is located in the lower portion for ease of operation and inspection. A large viewing window is standard for viewing the position of the switch blades while the door is closed. The front door and switch operating mechanism are interlocked to prohibit access to the switch compartment or vacuum circuit breaker when the switch is closed and prohibit operating the switch-operating mechanism when the door is open. The door interlock is mechanical for single switch-circuit breaker arrangements, and key interlocks are used for interlocking duplex switch-circuit breaker arrangements.

Load-interrupter switch Manually-operated, single-throw, gang-operated, stored-energy operated switch

It combines the blades with arc chutes to ensure no arcing occurs on main contacts extending the life of the main blades.

A single upward movement of the operating handle charges the operator and closes the switch, and conversely opens the switch by a downward movement of the handle.

Operating switch handle

Equipped with position indicators to show the position of switch as open or closed. Operating spring is discharged in either position.

Viewing window

A large 8" x 18" (203 mm x 457 mm) high-impact viewing window is located and gasketed on the front door for direct line-of-sight viewing of the three switch blades with the door closed.

Nameplate

Non-corrosive rating nameplate.

Full-height front door

The front door is equipped with two latching, chrome-plated handles. Handles are available in keyed type to add security. The door is equipped with a door stop.

Door and switch interlock

Door and switch interlock prevents access to the vacuum circuit breaker and switch when the switch is closed and prevents operation of switch handle when the door is open.

Provision for key interlocks

Operating mechanism is equipped with provision for key interlocking with remote devices, such as transformer secondary circuit breakers or other switches. Key interlocks can also be provided to prevent closing both switches of a duplex arrangement simultaneously.

Doors

The doors have stainless-steel door hinges and chrome-plated door fasteners.

Internal barrier

The internal barrier is a grounded, perforated, metal barrier inside the outer door in front of switch to shield against accidental contact.

Provisions for door padlocks

The front door (and rear door, if provided,) is equipped with a hasp for use with purchaser's padlock.

Steel structure

Each section is self-supporting and has 11-gauge steel panels with bolted frame.

Ventilation

Standard ventilation louvers are located in the top and bottom, front and rear of each section.

Bus bars

The bus bars are copper, silver-plated. Tin-plated is optional.

Ground bus

Ground bus extends across the vertical section.

Technical data

SIEBREAK-VCB metal-enclosed interrupter switchgear has been tested under short-circuit conditions in a recognized high-power test laboratory under UL procedures. Tests were performed in accordance with ANSI, IEEE, and CSA standards.

The design tests extend beyond the switch-circuit breaker assembly to also the enclosure assembly, including the venting system and the bus spacing and bracing, as well as mechanical life tests.

Footnotes:

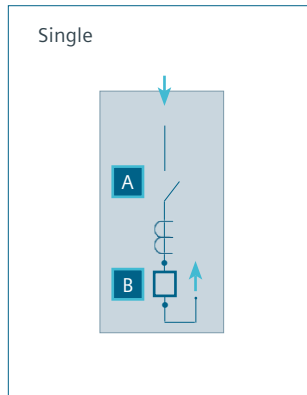
1. Main bus is not provided on single-unit arrangements.
2. Short-circuit current and closing and latching current are limited to the capabilities of the load-interrupter switch.
3. Closing and latching current is that of the circuit breaker and is based on the load-interrupter switch being in the CLOSED position.

SIEBREAK switchgear ratings						
System design voltage kV	Dielectric withstand voltage		Main bus ¹ continuous current A rms	Short-circuit current Unfused kA sym	Fault-closing current Unfused kA rms	
	Power frequency kV rms	Impulse kV peak				
5.0	19	60	600	25	39	
			1,200			38
			2,000			59
15.0	36	95	600	25	39	
			1,200			38
			2,000			59

Type SBVCB vacuum circuit breaker ratings							
System design voltage kV	Dielectric withstand voltage		Continuous current A rms	Short-circuit current ² kA sym	Circuit breaker type	Closing and latching current ^{2,3} Asymmetrical (1.55 x I) kA rms	Closing and latching current ^{2,3} Peak (2.60 x I) kA peak
	Power frequency kV rms	Impulse kV peak					
4.76	19	60	600 1,200	25	05-SBVCB-25-0600-65 05-SBVCB-25-1200-65	39	65
				38 ³	05-SBVCB-40-0600-104 05-SBVCB-40-1200-104		
15.0	36	95	600 1,200	25	15-SBVCB-25-0600-65 15-SBVCB-25-1200-65	39	65
				38 ³	15-SBVCB-40-0600-104 15-SBVCB-40-1200-104		

Switch-circuit breaker types

A cost-effective alternative when high and medium duty-cycle operations are needed



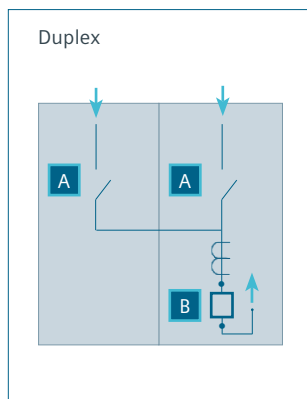
Description
Siemens type SIEBREAK-VCB metal-enclosed interrupter switchgear provides a safe, easy-to-use, cost-effective, reliable, and flexible solution for switching and fault protection for medium-voltage circuits rated from 2.4 kV to 15 kV. SIEBREAK-VCB switchgear provides a manually-operated, single-throw, gang-operated switch mechanism with fixed-mounted vacuum circuit breakers where high-duty operations are not needed while offering the characteristics critical for safety and system coordination.

Single-source applications
Single

Single vertical section equipped with one 600 A or 1,200 A load-interrupter switch rated up to 15 kV with cable incoming-line termination and load-cable termination. SIEBREAK-VCB offers cable direction for incoming and outgoing cable entry for either top or bottom and with an option for close-coupled line or load connection to dry- or liquid-filled type transformer.

Dual-source applications
Duplex

Two close-coupled vertical sections each equipped with one 600 A or 1,200 A load-interrupter switch rated up to 15 kV. SIEBREAK-VCB offers incoming and outgoing cable direction for either top or bottom cable entry with an option for close-coupled load connection to dry- or liquid-filled type transformer.



SIEBREAK-VCB is available in two basic switch types:

- Single
- Duplex.

These switch-circuit breaker types are applicable for standalone, transformer primary, and lineup applications.

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Application configuration

Standalone, transformer primary, and lineups

Application configuration

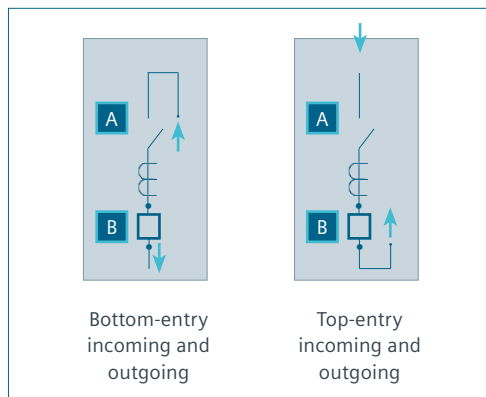
Siemens SIEBREAK-VCB switchgear is a complete product line used in medium-voltage applications:

- Standalone
- Transformer primary
- Lineups (i.e., main-tie-main, main-feeders, automatic-transfer).

Standalone bay

Standalone bay - single

Single freestanding switch-circuit breaker section with dimensions and weights shown in the table to the right. Ideal for an application where single-supply source is required for one outgoing feeder (usually not close-coupled to a transformer) for an industrial power user.



Standalone - single - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
5.0	Indoor	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
5.0	Outdoor	600	72 (1,829)	36 (914)	105 (2,667)	2,950 (1,338)
5.0	Outdoor	1,200	72 (1,829)	36 (914)	105 (2,667)	3,100 (1,406)
15.0	Indoor	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
15.0	Indoor	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
15.0	Outdoor	600	72 (1,829)	36 (914)	105 (2,667)	2,950 (1,338)
15.0	Outdoor	1,200	72 (1,829)	36 (914)	105 (2,667)	3,100 (1,406)

Footnotes:

1. Line and load cables may be top or bottom entry.
2. Optional distribution, intermediate, or station surge arresters.
3. Optional voltage transformers, and metering. Consult factory.
4. Optional control power transformers. Consult factory.
5. Reference the floor plan on pages 19-20, elevation views on pages 21-22, section views on page 23, and transformer terminations on pages 24-27 when applicable.

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

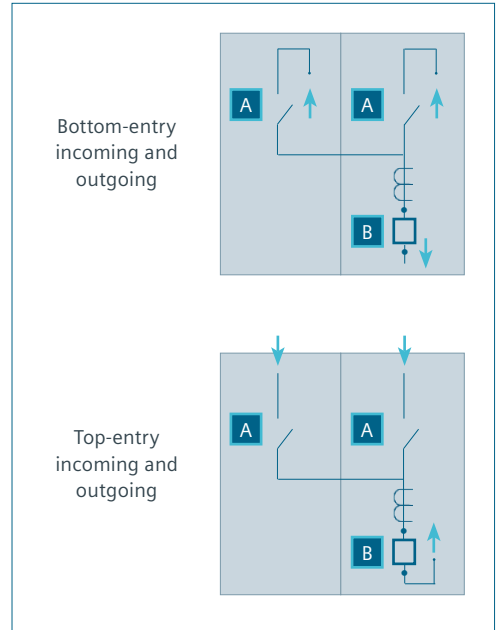
Standalone bay - duplex

Two close-coupled freestanding switch-circuit breaker sections with dimensions and weights shown in the table below. Ideal for an application where dual-supply source is required for one outgoing feeder (not close-coupled to a transformer) for an industrial power user.

Standalone - duplex - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	72 (1,829)	72 (1,829)	92 (2,337)	3,450 (1,565)
5.0	Indoor	1,200	72 (1,829)	72 (1,829)	92 (2,337)	3,600 (1,633)
5.0	Outdoor	600	72 (1,829)	72 (1,829)	105 (2,667)	4,050 (1,837)
5.0	Outdoor	1,200	72 (1,829)	72 (1,829)	105 (2,667)	4,200 (1,905)
15.0	Indoor	600	72 (1,829)	72 (1,829)	92 (2,337)	3,450 (1,565)
15.0	Indoor	1,200	72 (1,829)	72 (1,829)	92 (2,337)	3,600 (1,633)
15.0	Outdoor	600	72 (1,829)	72 (1,829)	105 (2,667)	4,050 (1,837)
15.0	Outdoor	1,200	72 (1,829)	72 (1,829)	105 (2,667)	4,200 (1,905)

Footnotes:

1. Line and load cables may be top or bottom entry.
2. Optional distribution, intermediate, or station surge arresters.
3. Optional voltage transformers and metering.
4. Optional control power transformers - load connected and located in the non-circuit breaker section of the two sections.



Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Transformer primary

Cable terminations provided for incoming line. The load termination is a close-coupled connection to a transformer primary.

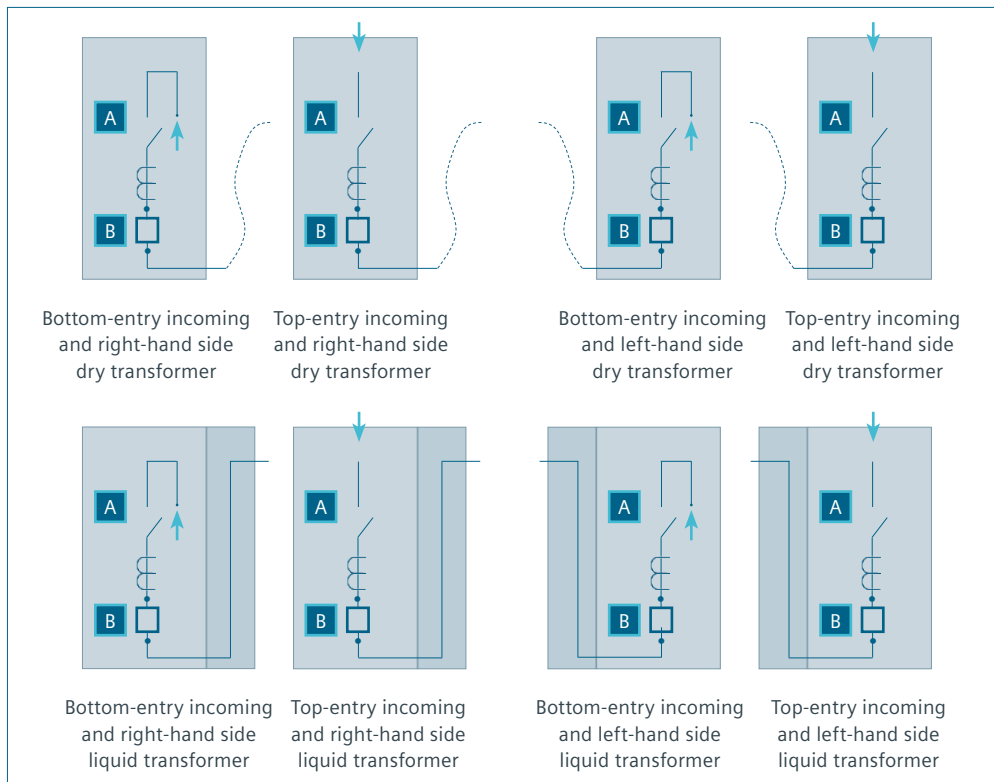
Transformer primary - single

Single switch-circuit breaker section with dimensions and weights shown in the table below. Ideal for single-source applications with outgoing close-coupled connection to the primary side of a dry or liquid-filled transformer for a low-voltage or medium-voltage substation.

Transformer primary - single - estimated dimensions and weight in in. (mm) or lbs (kg)							
Maximum design voltage kV	Enclosure type	Transformer type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	Dry	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
5.0	Indoor	Dry	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
5.0	Indoor	Liquid-filled	600	72 (1,829)	54 (1,372)	92 (2,337)	2,800 (1,260)
5.0	Indoor	Liquid-filled	1,200	72 (1,829)	54 (1,372)	92 (2,337)	2,950 (1,338)
5.0	Outdoor	Dry	600	72 (1,829)	38 (965)	105 (2,667)	2,950 (1,338)
5.0	Outdoor	Dry	1,200	72 (1,829)	38 (965)	105 (2,667)	3,100 (1,406)
5.0	Outdoor	Liquid-filled	600	72 (1,829)	54 (1,372)	105 (2,667)	3,400 (1,542)
5.0	Outdoor	Liquid-filled	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,550 (1,610)
15.0	Indoor	Dry	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
15.0	Indoor	Dry	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
15.0	Indoor	Liquid-filled	600	72 (1,829)	54 (1,372)	92 (2,337)	2,800 (1,260)
15.0	Indoor	Liquid-filled	1,200	72 (1,829)	54 (1,372)	92 (2,337)	2,950 (1,338)
15.0	Outdoor	Dry	600	72 (1,829)	38 (965)	105 (2,667)	2,950 (1,338)
15.0	Outdoor	Dry	1,200	72 (1,829)	38 (965)	105 (2,667)	3,100 (1,406)
15.0	Outdoor	Liquid-filled	600	72 (1,829)	54 (1,372)	105 (2,667)	3,400 (1,542)
15.0	Outdoor	Liquid-filled	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,550 (1,610)

Footnotes:

- Optional distribution, intermediate, or station surge arresters for incoming-line terminations.
- Left- or right-side, dry- or liquid-filled type transformers are available.
- Liquid-filled and outdoor dry-type connection to be throat-type connection.
- Optional voltage transformers and metering. Refer to pages 30-33 for details.
- Optional control power transformer. Consult factory for depth requirements.



Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Transformer primary - duplex

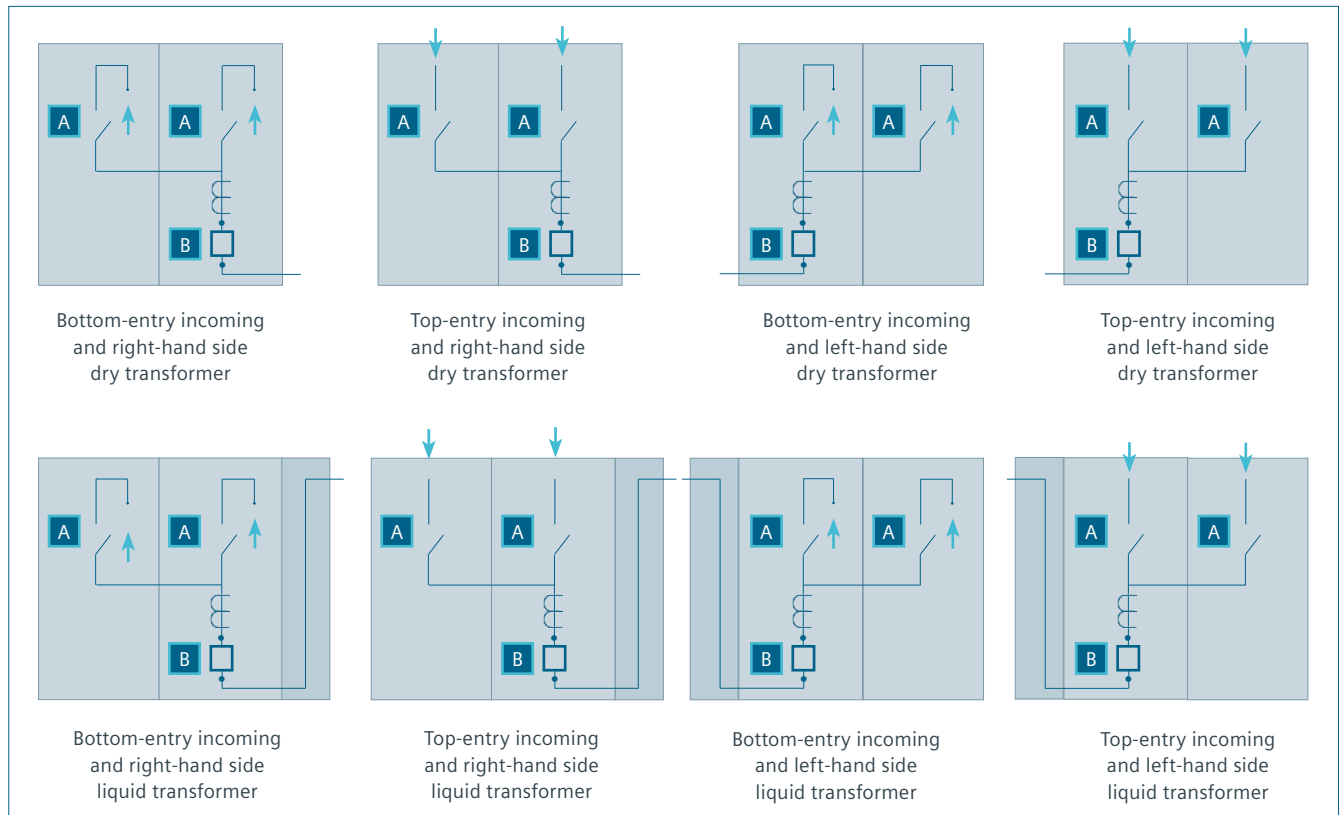
Two load-interrupter switch sections connected to one set of fuses with dimensions and weights shown in the table below. Ideal for dual-supply source applications for an outgoing, close-coupled connection to a primary side of a dry or liquid-filled transformer for a low-voltage or medium-voltage substation.

Footnotes:

1. Optional distribution, intermediate, or station surge arresters for incoming-line terminations.
2. Left- or right-side, dry- or liquid-filled type transformers are available.
3. Liquid-filled and outdoor dry-type connection to be throat-type connection.
4. Optional voltage transformers and metering. Refer to pages 30-33 for details.
5. Optional control power transformer. Consult factory for depth requirements.

Transformer primary - duplex - estimated dimensions and weight in in. (mm) or lbs (kg)							
Maximum design voltage kV	Enclosure type	Transformer type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	Dry	600	72 (1,829)	72 (1,829)	92 (2,337)	3,750 (1,701)
5.0	Indoor	Dry	1,200	72 (1,829)	72 (1,829)	92 (2,337)	3,900 (1,769)
5.0	Indoor	Liquid-filled	600	72 (1,829)	90 (2,286)	92 (2,337)	4,200 (1,905)
5.0	Indoor	Liquid-filled	1,200	72 (1,829)	90 (2,286)	92 (2,337)	4,350 (1,973)
5.0	Outdoor	Dry	600	72 (1,829)	75 (1,905)	105 (2,667)	4,350 (1,973)
5.0	Outdoor	Dry	1,200	72 (1,829)	75 (1,905)	105 (2,667)	4,500 (2,041)
5.0	Outdoor	Liquid-filled	600	72 (1,829)	90 (2,286)	105 (2,667)	4,800 (2,177)
5.0	Outdoor	Liquid-filled	1,200	72 (1,829)	90 (2,286)	105 (2,667)	4,950 (2,245)
15.0	Indoor	Dry	600	72 (1,829)	72 (1,829)	92 (2,337)	3,750 (1,701)
15.0	Indoor	Dry	1,200	72 (1,829)	72 (1,829)	92 (2,337)	3,900 (1,769)
15.0	Indoor	Liquid-filled	600	72 (1,829)	90 (2,286)	92 (2,337)	4,200 (1,905)
15.0	Indoor	Liquid-filled	1,200	72 (1,829)	90 (2,286)	92 (2,337)	4,350 (1,973)
15.0	Outdoor	Dry	600	72 (1,829)	75 (1,905)	105 (2,667)	4,350 (1,973)
15.0	Outdoor	Dry	1,200	72 (1,829)	75 (1,905)	105 (2,667)	4,500 (2,041)
15.0	Outdoor	Liquid-filled	600	72 (1,829)	90 (2,286)	105 (2,667)	4,800 (2,177)
15.0	Outdoor	Liquid-filled	1,200	72 (1,829)	90 (2,286)	105 (2,667)	4,950 (2,245)

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker



Lineups

Multiple vertical sections close-coupled and bus-connected together into a lineup configuration with one or more supply sources characterize lineup configuration types. SIEBREAK-VCB switchgear is available in the lineup configuration for section types including main, tie, and branch feeders. These section types are limited to the single-switch type (duplex not available in a lineup) with main cross bus bars located in the top of the enclosure. Three section types are main, branch feeder, and tie.

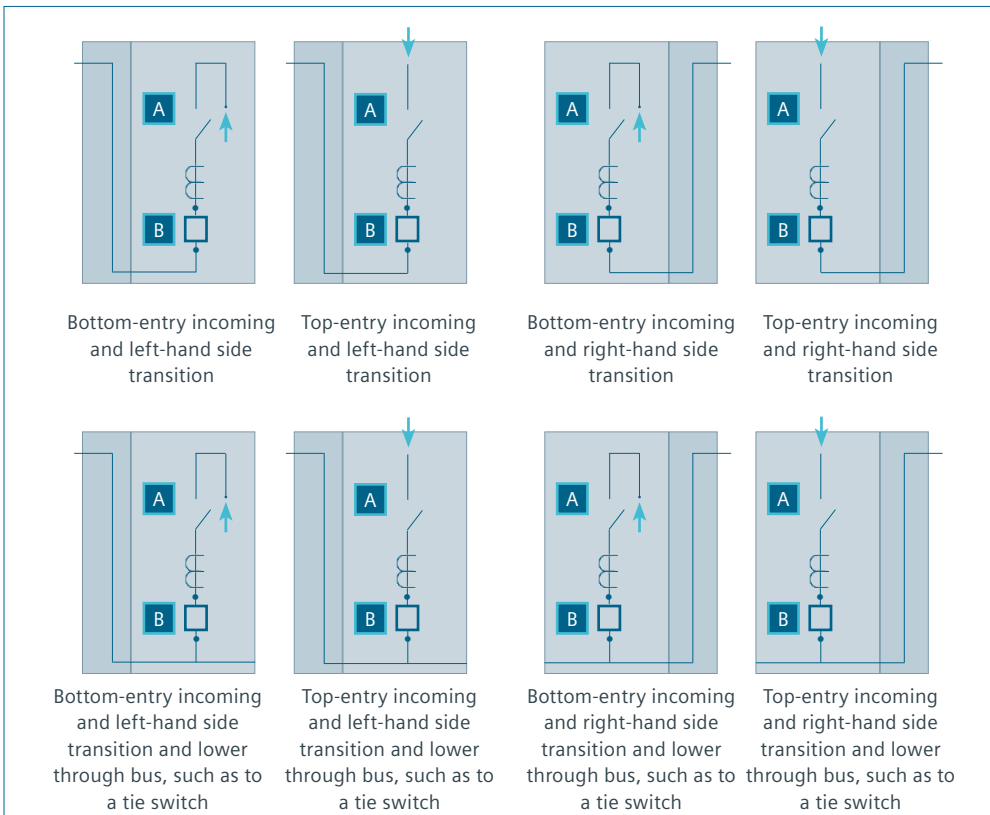
Lineups - main incomer

One vertical section is equipped with a 600 A or 1,200 A load-interrupter switch and one 18 in. (457 mm) bus transition section. The incoming-line cable termination is available for either top or bottom entry. Outgoing termination will be a close-coupled load connection with either left- or right-side transition to an adjacent vertical section of SIEBREAK-VCB branch feeders and tie panels.

Lineups - main incomer - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	72 (1,829)	54 (1,372)	92 (2,337)	3,000 (1,361)
5.0	Indoor	1,200	72 (1,829)	54 (1,372)	92 (2,337)	3,150 (1,429)
5.0	Outdoor	600	72 (1,829)	54 (1,372)	105 (2,667)	3,600 (1,633)
5.0	Outdoor	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,750 (1,701)
15.0	Indoor	600	72 (1,829)	54 (1,372)	92 (2,337)	3,000 (1,361)
15.0	Indoor	1,200	72 (1,829)	54 (1,372)	92 (2,337)	3,150 (1,429)
15.0	Outdoor	600	72 (1,829)	54 (1,372)	105 (2,667)	3,600 (1,633)
15.0	Outdoor	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,750 (1,701)

Footnotes:

- Optional distribution, intermediate, or station surge arresters for incoming-line terminations.
- Optional voltage transformers, for both incoming-line terminations.
- Optional low-voltage compartment power metering.
- Optional control power transformer. Consult factory for depth requirement.



Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Lineups - branch

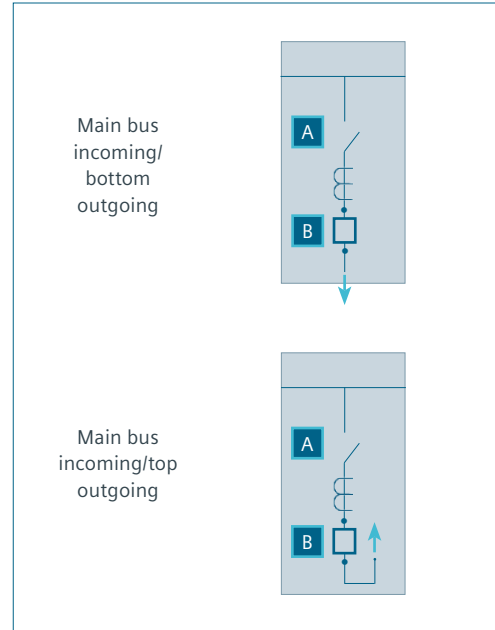
The branch-feeder type consists of one vertical section equipped with a 600 A or 1,200 A switch-circuit breaker. The main bus is rated 1,200 A or 2,000 A³ depending upon the application. The outgoing load terminations will be cables for either top or bottom entry.

Lineups - branch - estimated dimensions and weight in in. (mm) or lbs (kg)

Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
5.0	Indoor	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
5.0	Outdoor	600	72 (1,829)	36 (914)	105 (2,667)	2,950 (1,338)
5.0	Outdoor	1,200	72 (1,829)	36 (914)	105 (2,667)	3,100 (1,406)
15.0	Indoor	600	72 (1,829)	36 (914)	92 (2,337)	2,350 (1,066)
15.0	Indoor	1,200	72 (1,829)	36 (914)	92 (2,337)	2,500 (1,134)
15.0	Outdoor	600	72 (1,829)	36 (914)	105 (2,667)	2,950 (1,338)
15.0	Outdoor	1,200	72 (1,829)	36 (914)	105 (2,667)	3,100 (1,406)

Footnotes:

1. Optional distribution, intermediate, or station surge arresters.
2. Optional control power transformer. Consult factory for depth requirement.
3. 2,000 A bus is available when transitioning to GM-SG non-arc-resistant, metal-clad switchgear or other 2,000 A main incoming switching devices.



Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Lineups - tie

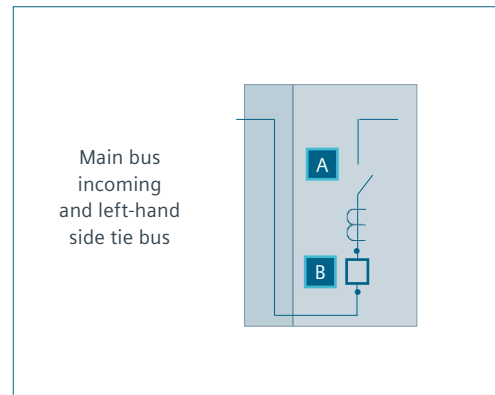
The tie switch-circuit breaker type consists of one vertical section equipped with a 600 A or 1,200 A load-interrupter switch with fixed-mounted vacuum circuit breaker plus an 18 in. (457 mm) transition section. The terminations will be either lower or upper main bus rated 1,200 A.

Lineups - tie - estimated dimensions and weight in in. (mm) or lbs (kg)

Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	62 (1,574)	54 (1,372)	92 (2,337)	3,000 (1,361)
5.0	Indoor	1,200	62 (1,574)	54 (1,372)	92 (2,337)	3,150 (1,429)
5.0	Outdoor	600	72 (1,829)	54 (1,372)	105 (2,667)	3,600 (1,633)
5.0	Outdoor	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,750 (1,701)
15.0	Indoor	600	62 (1,574)	54 (1,372)	92 (2,337)	3,000 (1,361)
15.0	Indoor	1,200	62 (1,574)	54 (1,372)	92 (2,337)	3,150 (1,429)
15.0	Outdoor	600	72 (1,829)	54 (1,372)	105 (2,667)	3,600 (1,633)
15.0	Outdoor	1,200	72 (1,829)	54 (1,372)	105 (2,667)	3,750 (1,701)

Footnotes:

1. Optional distribution, intermediate, or station surge arresters.
2. Optional control power transformer. Consult factory for depth requirement.



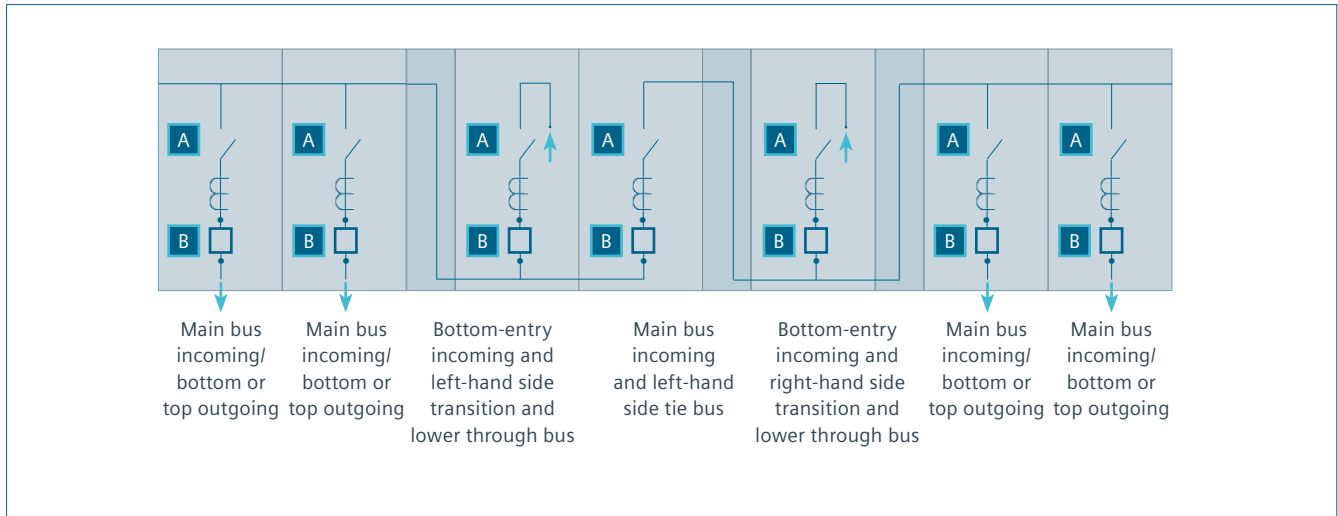
Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Lineup configurations

Main-tie-main

This configuration consists of main, tie, and branch feeder switch-circuit breaker types to provide a multi-source solution. It is also equipped with main cross bus up to 1,200 A.

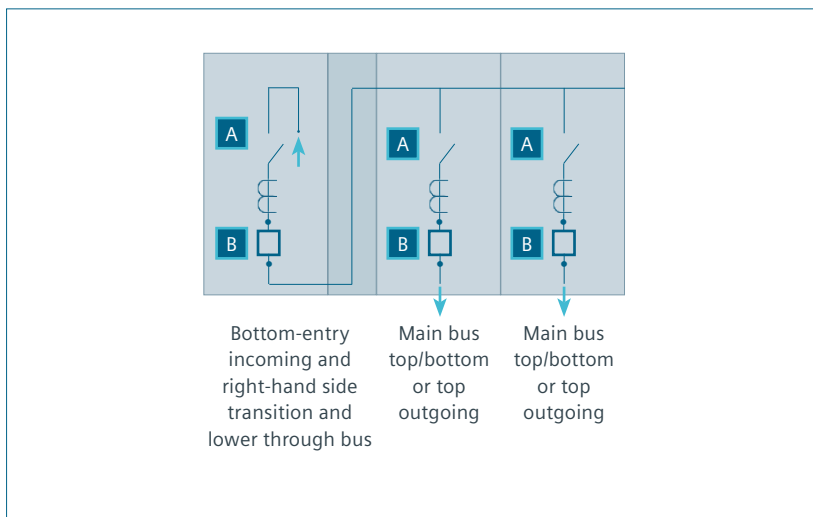
Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker



Main feeder

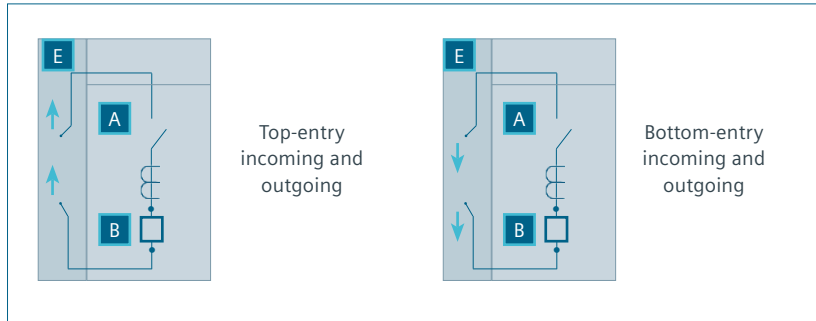
This configuration consists of main and branch feeder switch-circuit breaker types. It is also equipped with main cross bus up to 1,200 A.

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

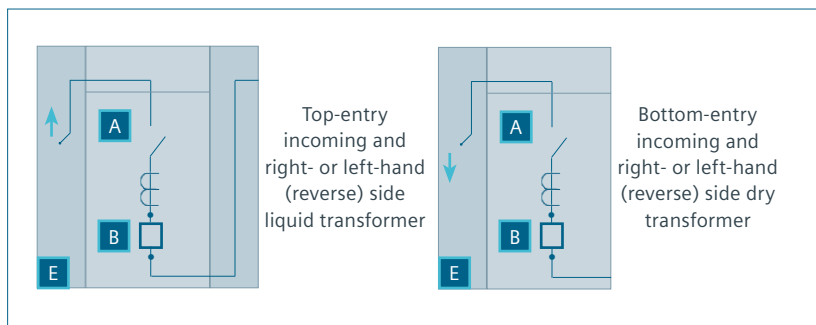


Single - front access

Single freestanding switch-circuit breaker panel and cable-pull section with dimensions and weights shown in the table below. Ideal for tight spaces for a single-supply source for one outgoing feeder (not close coupled to a transformer) for an industrial power user.



Single - front access - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	56 (1,422)	60 (1,524)	92 (2,337)	2,800 (1,270)
5.0	Indoor	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,950 (1,338)
15.0	Indoor	600	56 (1,422)	60 (1,524)	92 (2,337)	2,800 (1,270)
15.0	Indoor	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,950 (1,338)



Item	Description
A	1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker
E	Cable-pull section

Footnotes:

1. Optional distribution, intermediate, or station surge arresters.
2. Outdoor enclosure not available for front access.
3. Consult factory for auxiliary devices (i.e., CPT, VTs).

Front-access configurations

SIEBREAK-VCB front-access design offers a space-savings option enabling the user to install the rear of the switchgear near a wall in an electrical room or power equipment center. The front-access design is available in single switch type (not available for duplex) and available as a lineup for the single-switch type (not for duplex).

Standalone

All cable terminations for both incoming-line and outgoing-load terminations characterize the standalone configuration type.

Item	Description
A	600 A interrupter switch
B	Fixed-mounted vacuum circuit breaker
E	Cable-pull section

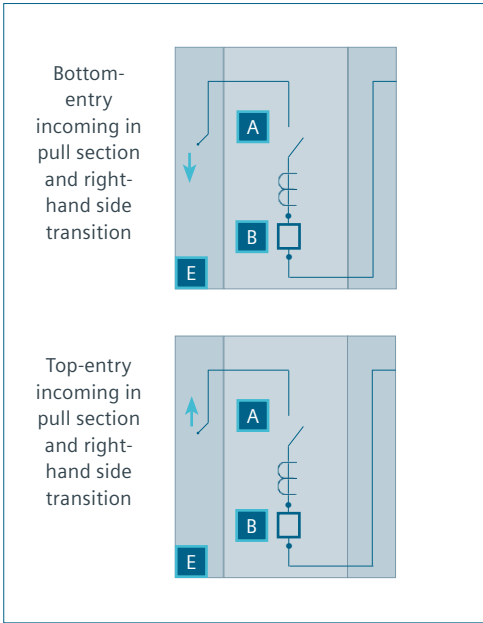
Footnotes:

1. Optional distribution, intermediate, or station surge arresters.
2. Outdoor enclosure not available for front access.
3. Consult factory for auxiliary devices (i.e., CPT, VTs).

Single - transformer primary - front access

Single switch-circuit breaker panel with dimensions and weights shown in the table below. Suited for single-source applications with outgoing close-coupled connection to primary side of a dry or liquid-filled transformer for a low-voltage or medium-voltage substation.

Single - transformer primary - front access - estimated dimensions and weight in in. (mm) or lbs (kg)							
Maximum design voltage kV	Enclosure type	Transformer type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	Dry	600	56 (1,422)	60 (1,524)	92 (2,337)	2,700 (1,225)
5.0	Indoor	Dry	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,850 (1,293)
5.0	Indoor	Liquid-filled	600	56 (1,422)	78 (1,981)	92 (2,337)	3,150 (1,429)
5.0	Indoor	Liquid-filled	1,200	56 (1,422)	78 (1,981)	92 (2,337)	3,300 (1,497)
15.0	Indoor	Dry	600	56 (1,422)	60 (1,524)	92 (2,337)	2,700 (1,225)
15.0	Indoor	Dry	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,850 (1,293)
15.0	Indoor	Liquid-filled	600	56 (1,422)	78 (1,981)	92 (2,337)	3,150 (1,429)
15.0	Indoor	Liquid-filled	1,200	56 (1,422)	78 (1,981)	92 (2,337)	3,300 (1,497)



Lineups - front access

Multiple vertical sections close-coupled and bus-connected together into a lineup configuration with one or more supply sources characterize lineup configuration types. SIEBREAK-VCB switchgear is available in the lineup configuration for section types including main, tie, and branch feeders. These section types are limited to the single switch-circuit breaker type (duplex not available in a lineup) with main cross bus bars located in the top of the enclosure.

Lineups - main incomer - front access

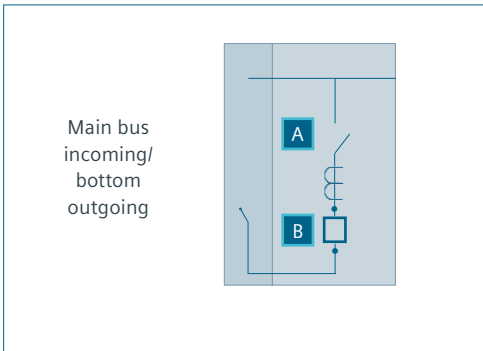
A lineup consists of a vertical section is equipped with a 600 A or 1,200 A switch-circuit breaker, an incoming cable-pull section, and one 18 in. (457 mm) bus transition section. The incoming-line cable termination is available for either top or bottom entry. Outgoing termination will be close-coupled load connection either left- or right-side transition to an adjacent vertical section of front-access SIEBREAK-VCB branch feeders and tie panel.

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker
E	Cable-pull section

Lineups - main incomer front access - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	56 (1,422)	78 (1,981)	92 (2,337)	3,250 (1,474)
5.0	Indoor	1,200	56 (1,422)	78 (1,981)	92 (2,337)	3,400 (1,542)
15.0	Indoor	600	56 (1,422)	78 (1,981)	92 (2,337)	3,250 (1,474)
15.0	Indoor	1,200	56 (1,422)	78 (1,981)	92 (2,337)	3,400 (1,542)

Footnotes:

- Optional distribution, intermediate, or station surge arresters.
- Outdoor enclosure not available for front access.
- Consult factory for auxiliary devices (i.e., CPT, VTs).



Lineups - branch - front access

The branch-feeder type consists of one vertical section equipped with a 600 A or 1,200 A switch-circuit breaker. The incoming will be main bus rated 1,200 A or 2,000 A⁴ depending upon the application. The outgoing load terminations will be cables for either top or bottom entry.

Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

Lineups - branch - estimated dimensions and weight in in. (mm) or lbs (kg)						
Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	56 (1,422)	60 (1,524)	92 (2,337)	2,800 (1,270)
5.0	Indoor	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,950 (1,338)
15.0	Indoor	600	56 (1,422)	60 (1,524)	92 (2,337)	2,800 (1,270)
15.0	Indoor	1,200	56 (1,422)	60 (1,524)	92 (2,337)	2,950 (1,338)

Footnotes:

- Optional distribution, intermediate, or station surge arresters.
- Outdoor enclosure not available for front access.
- Consult factory for auxiliary devices (i.e., CPT, VTs).
- 2,000 A bus is available when transitioning to GM-SG non-arc-resistant, metal-clad switchgear.

Lineups - tie - front access

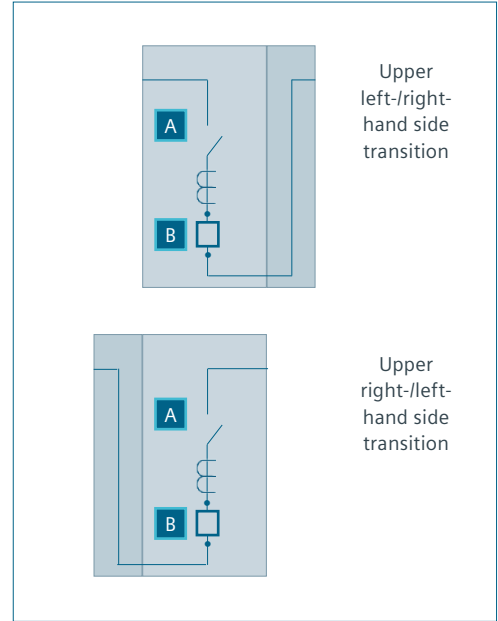
The tie switch-circuit breaker type consists of one vertical section equipped with a 600 A or 1,200 A switch-circuit breaker with fixed-mounted vacuum circuit breaker plus an 18 in. (457 mm) transition section. The terminations will be either lower or upper main bus rated 1,200 A.

Lineups - tie - estimated dimensions and weight in in. (mm) or lbs (kg)

Maximum design voltage kV	Enclosure type	Continuous current A	Depth	Width	Height	Weight
5.0	Indoor	600	56 (1,422)	54 (1,372)	92 (2,337)	2,500 (1,133)
5.0	Indoor	1,200	56 (1,422)	54 (1,372)	92 (2,337)	2,650 (1,202)
15.0	Indoor	600	56 (1,422)	54 (1,372)	92 (2,337)	2,550 (1,157)
15.0	Indoor	1,200	56 (1,422)	54 (1,372)	92 (2,337)	2,700 (1,225)

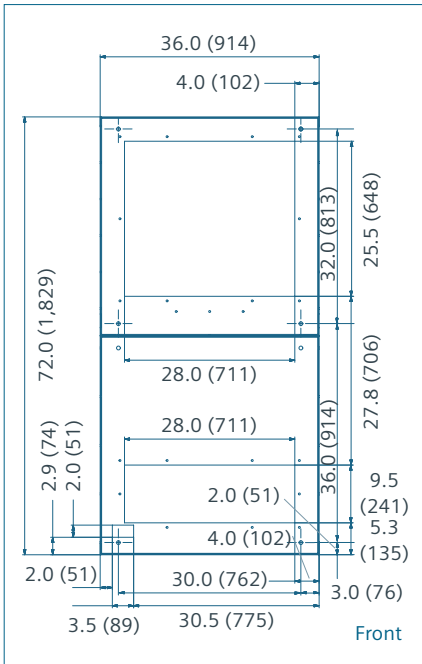
Footnotes:

- ¹ Optional distribution, intermediate, or station surge arresters.
- ² Outdoor enclosure not available for front access.
- ³ Consult factory for auxiliary devices (i.e., CPT, VTs).

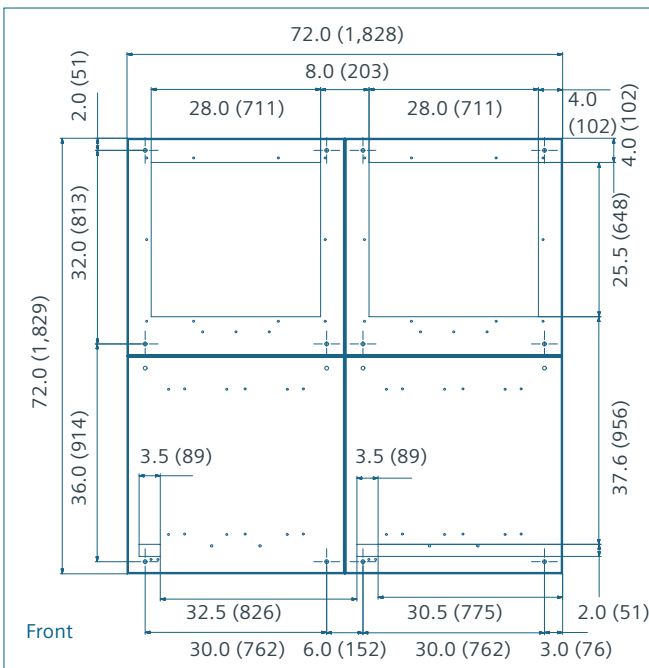


Item	Description
A	600 A or 1,200 A interrupter switch
B	Fixed-mounted vacuum circuit breaker

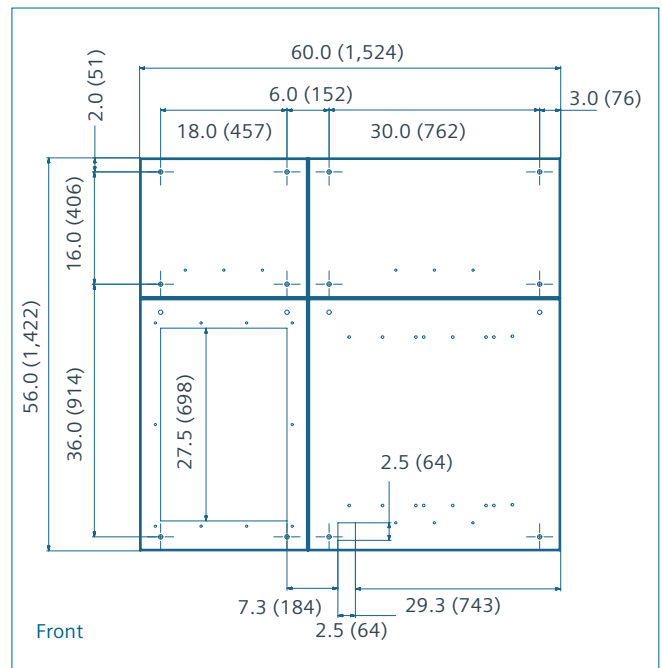
Floor plans and anchoring



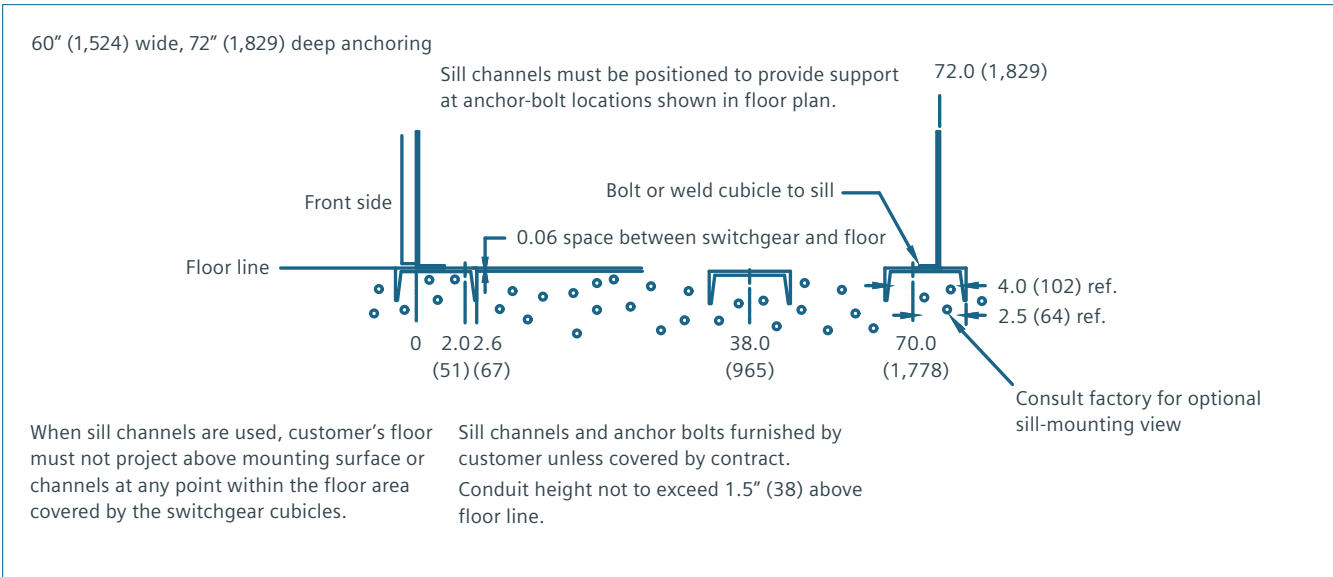
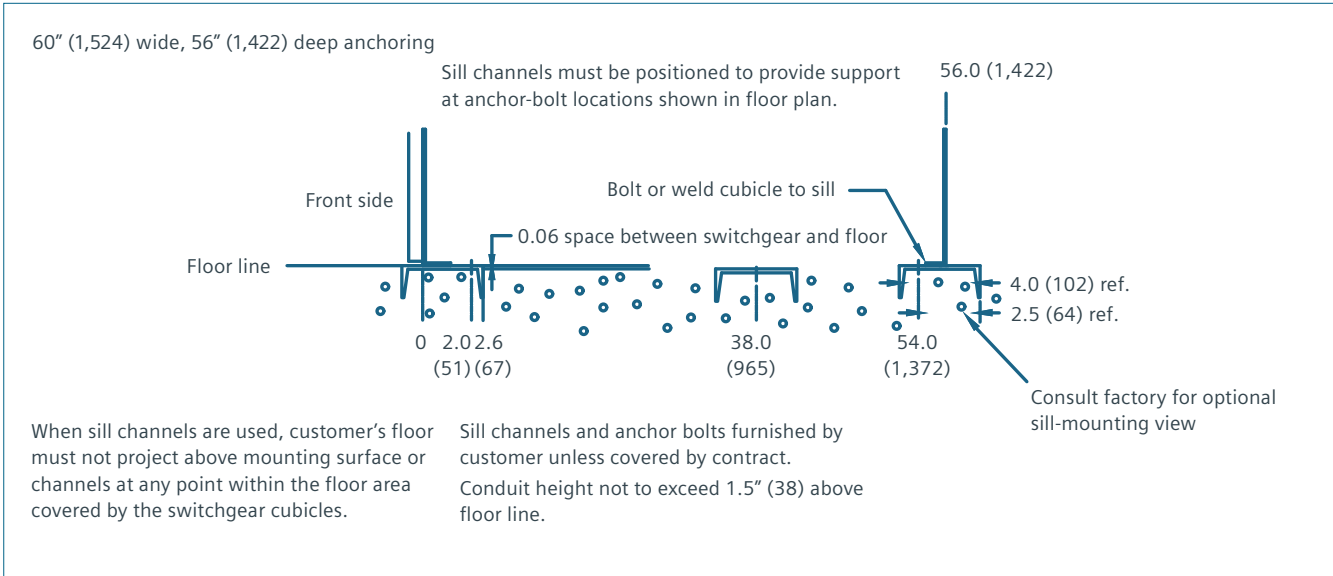
36" (914), wide 72" (1,829) deep floor plan



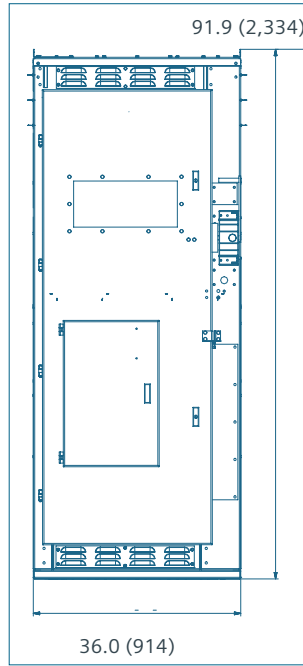
72" (1,829), wide 72" (1,829) deep duplex floor plan



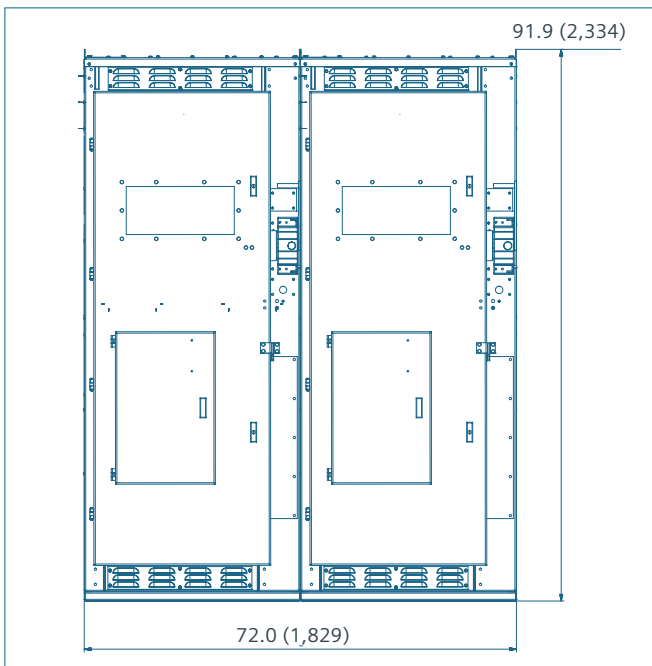
60" (1,524), wide 56" (1,422) deep floor plan



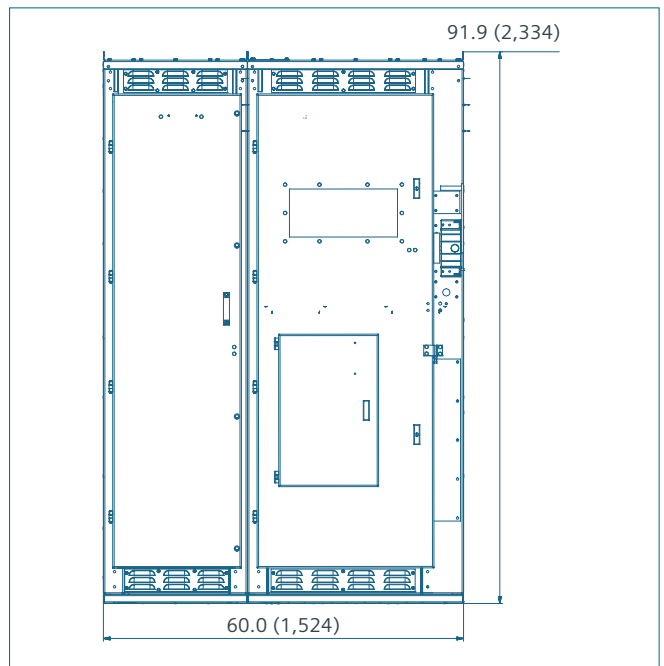
Elevation views



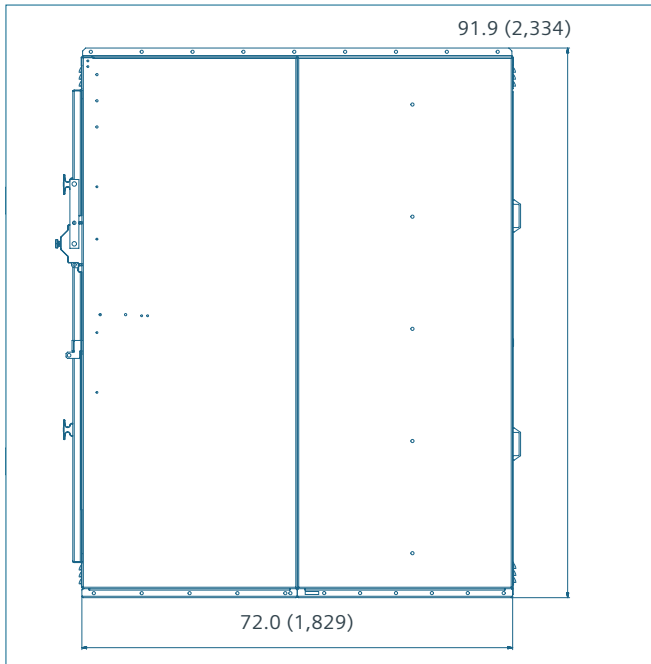
Single switch



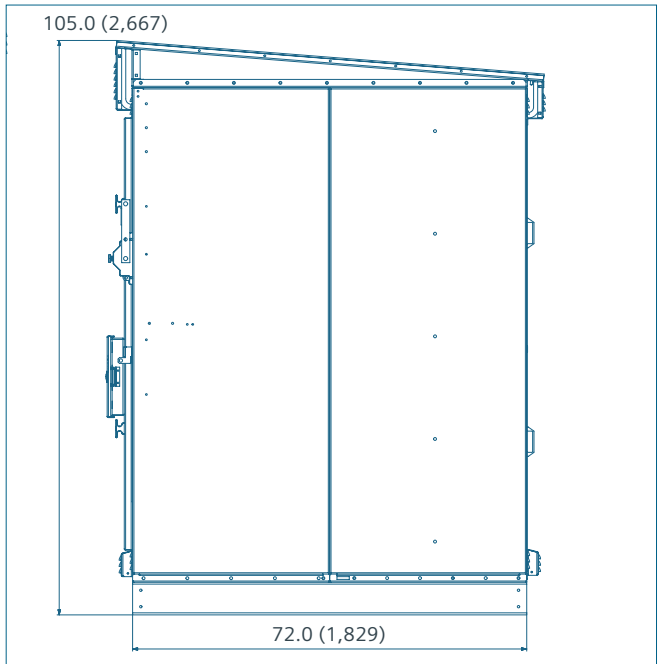
Duplex switch



Single switch front access



Indoor - single, duplex or selector switch 72"

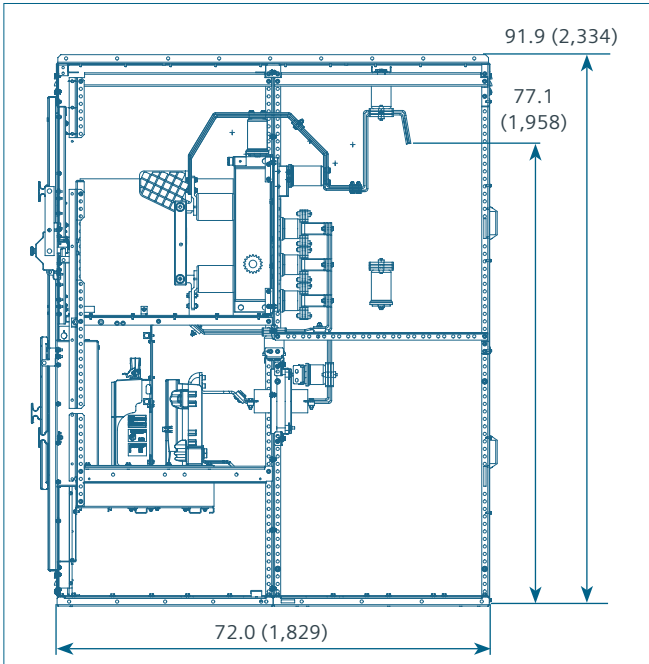


Outdoor - single, duplex, or selector switch

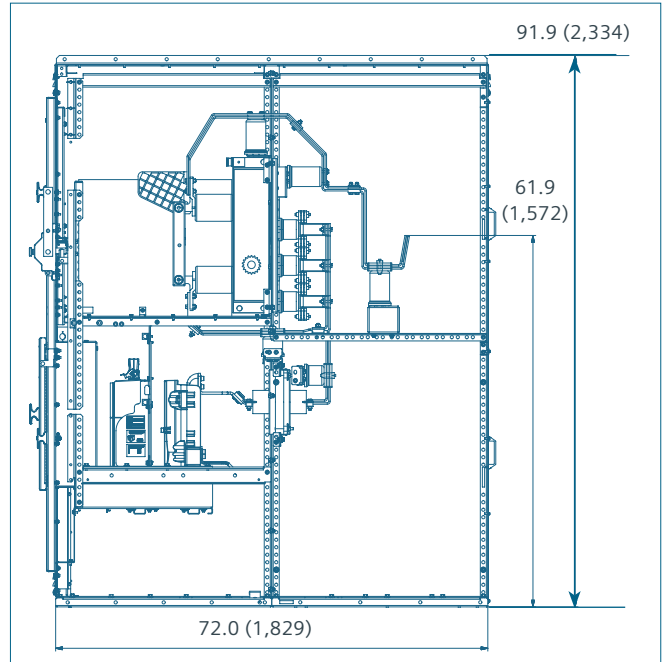
Side views



Section views



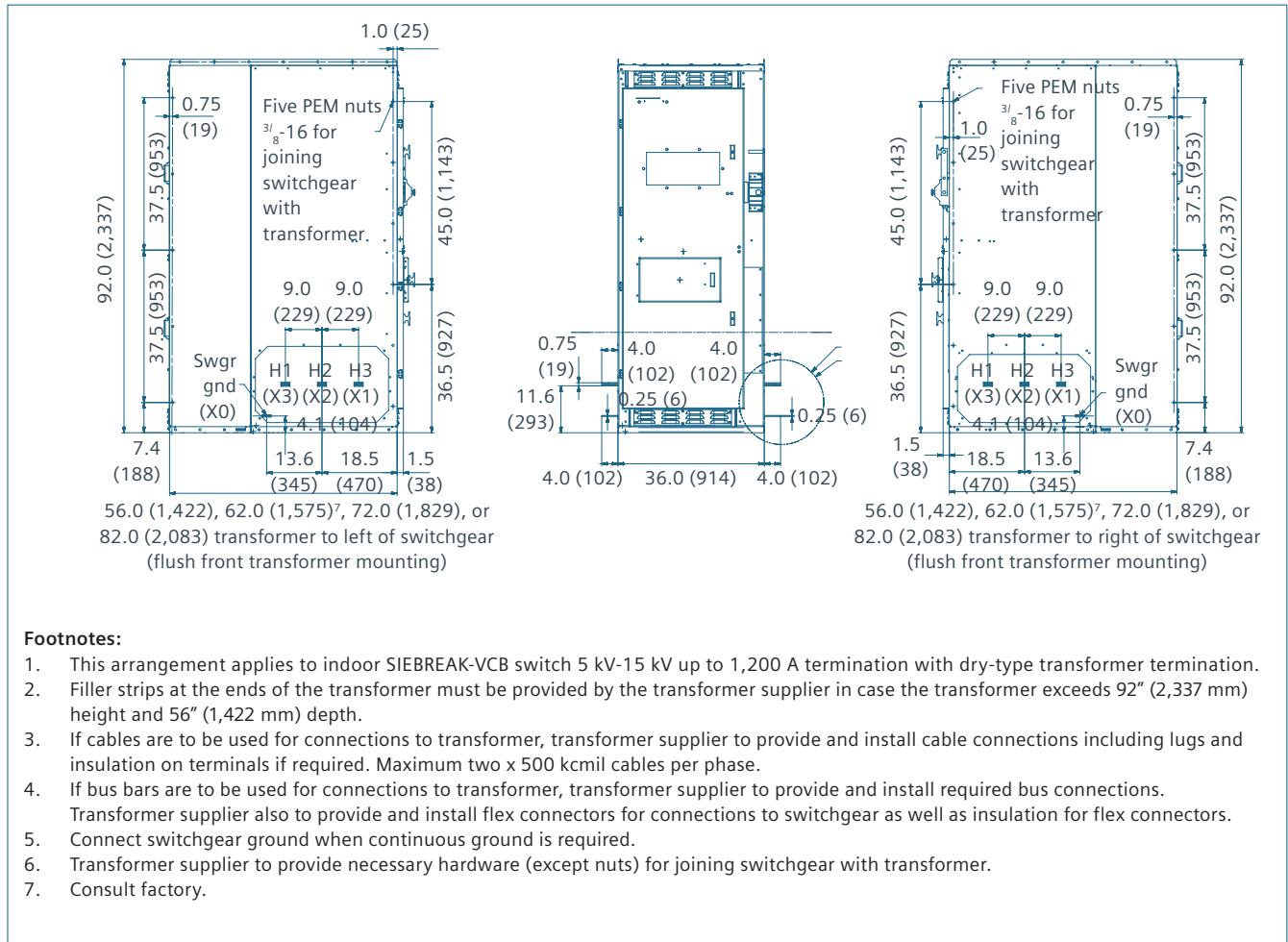
Duplex - bottom entry



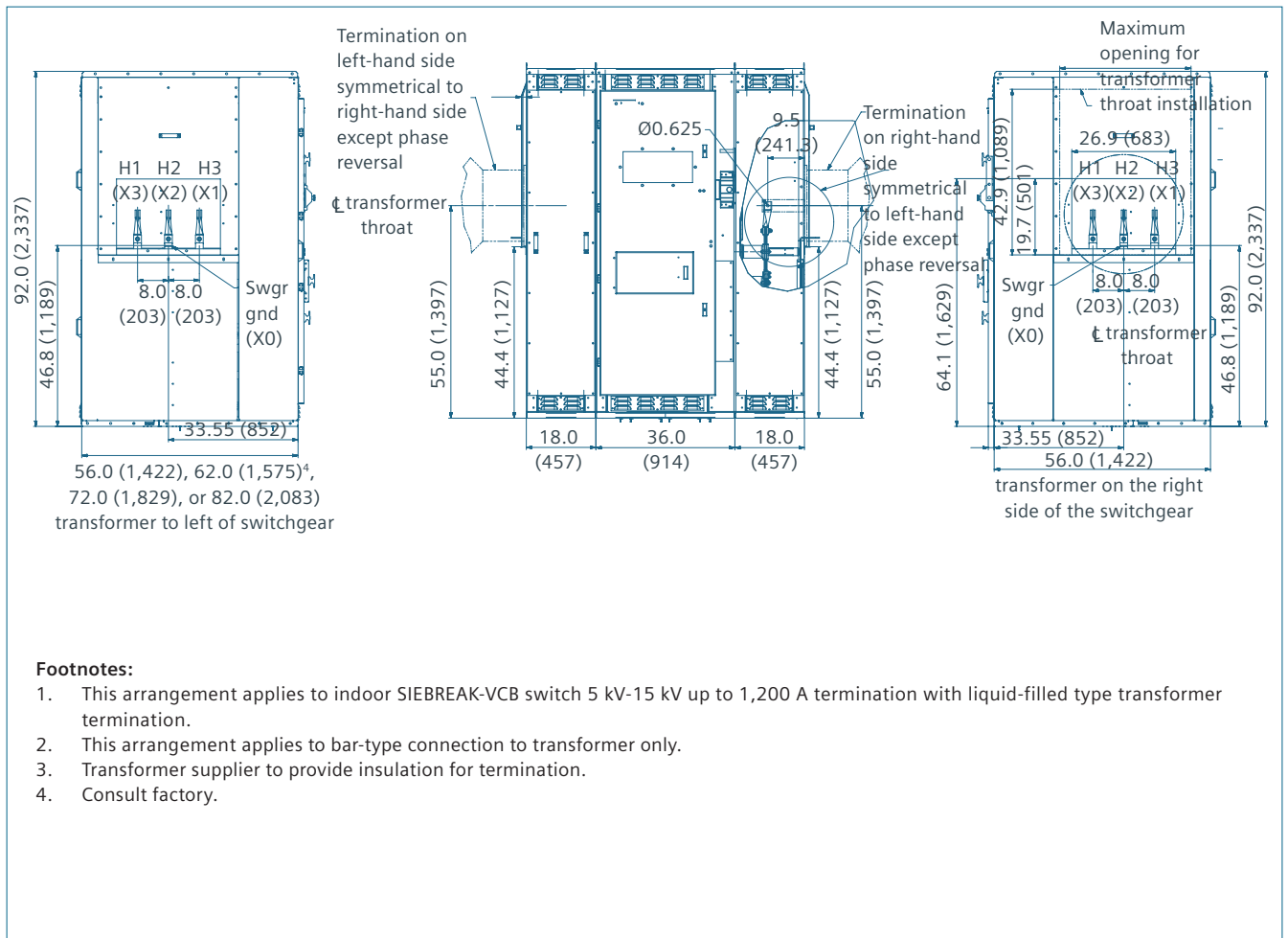
Duplex - top entry

Transformer terminations

Indoor - dry transformer



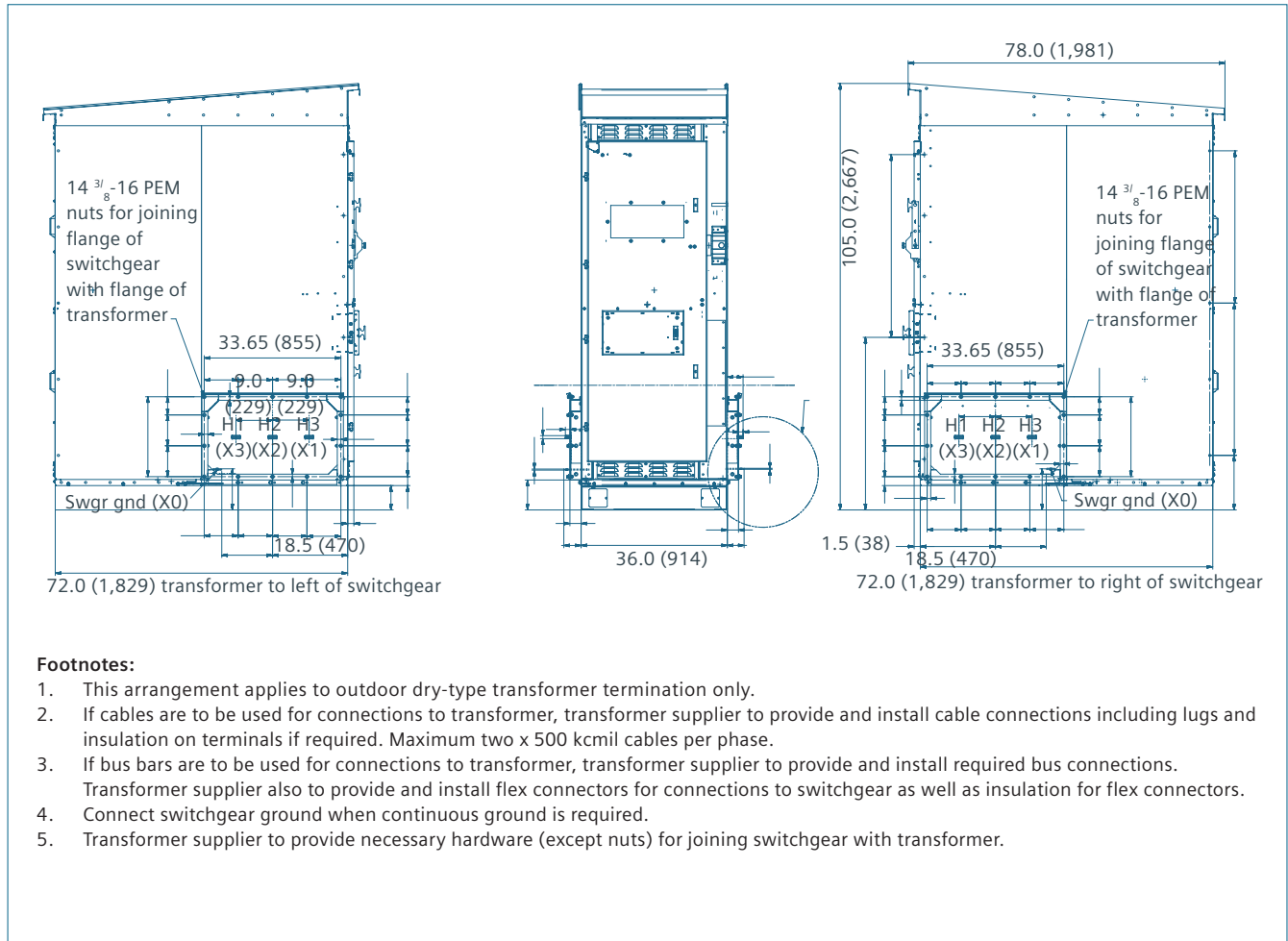
Indoor - liquid-filled transformer



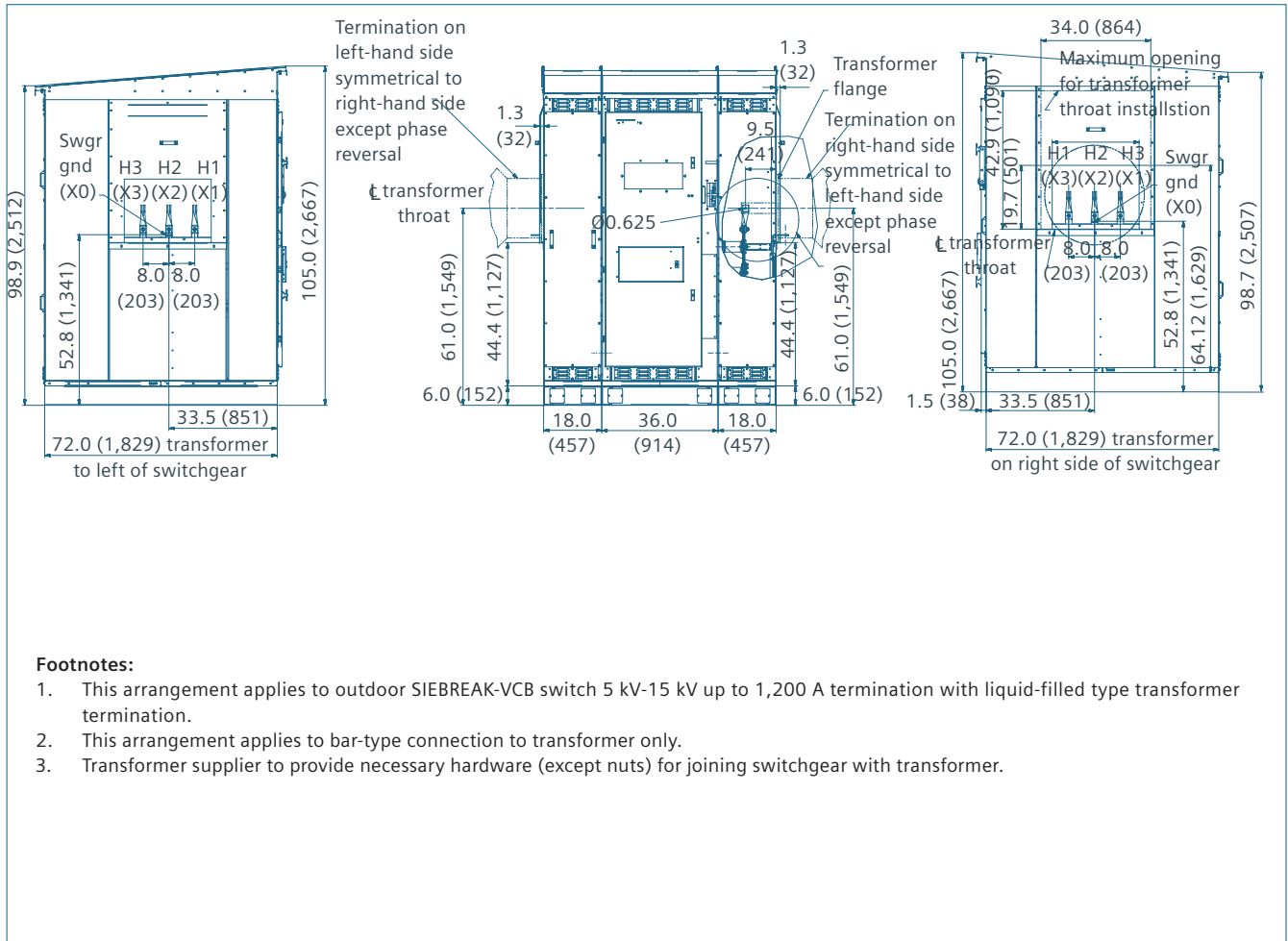
Footnotes:

1. This arrangement applies to indoor SIEBREAK-VCB switch 5 kV-15 kV up to 1,200 A termination with liquid-filled type transformer termination.
2. This arrangement applies to bar-type connection to transformer only.
3. Transformer supplier to provide insulation for termination.
4. Consult factory.

Outdoor - dry transformer



Outdoor - liquid-filled transformer



Circuit breaker ratings and options

Type SBVCB family of circuit breakers is equipped for medium- and heavy-duty medium-voltage commercial and industrial applications.

Available type SBVCB vacuum circuit breakers:

Circuit breaker type ¹	Maximum design voltage (V) ² kV rms	Voltage range factor (K) ³	Withstand voltage levels		Continuous current A rms	Short circuit (I) ^{4,5,7} kA rms sym	Interrupting time ⁶ ms/cycles
			Power frequency kV rms	Lightning impulse (BIL) kV peak			
05-SBVCB-25-xxxx-65	4.76	1.0	19	16	600, 1,200	25	50/3
05-SBVCB-40-xxxx-104	4.76	1.0	19	60	600, 1,200	38 ⁷	50/3
15-SBVCB-25-xxxx-65	15.0	1.0	36	95	600, 1,200	25	50/3
15-SBVCB-40-xxxx-104	15.0	1.0	36	95	600, 1,200	38 ⁷	50/3

Circuit breaker type ¹	Permissible tripping delay (Y) sec	Maximum symmetrical interrupting (I) kA rms sym	%dc component %	Short-time current (I) (three seconds) kA rms	Closing and latching (momentary)	
					Asymmetrical (1.55 x I) kA rms	Peak (2.6 x I) kA peak
05-SBVCB-25-xxxx-65	2	25	47	25	39	65
05-SBVCB-40-xxxx-104	2	38 ⁷	47	38 ⁷	59 ⁷	99 ⁷
15-SBVCB-25-xxxx-65	2	25	47	25	39	65
15-SBVCB-40-xxxx-104	2	38 ⁷	47	38 ⁷	59 ⁷	99 ⁷

Footnotes:

1. "xxxx" in type designation refers to the continuous current rating 0600 A or 1,200 A, as appropriate.
2. Maximum design voltage for which the circuit breaker is designed and the upper limit for operation.
3. K is listed for information purposes only. For circuit breakers rated on a "constant kA" ratings basis, the voltage range factor is 1.0.
4. All values apply to polyphase and line-to-line faults.
5. Standard duty cycle is O - 0.3s - CO - 3 min. - CO.
6. Standard rating interrupting time is three-cycles (50 ms).
7. 40 kA circuit breaker values are limited to the capabilities of the load-interrupter switch.

Circuit breaker options:

Features	Options
Control voltage	120 Vac ¹ , 230 Vac ¹ , 48 Vdc, 125 Vdc, 250 Vdc
Interrupting time	3-cycle standard
Trip coil	1 x trip coil
	2 x trip coil
	1 x trip coil and under voltage
Auxiliary contact	6 NO/6 NC, 12 NO/12 NC

Footnote:

1. For ac control voltage, tripping employs capacitor trip.



Protective relays

SIEBREAK-VCB switchgear is equipped with a protection relay with current transformers for overcurrent and short-circuit protection. For extended system protection, such as motor protection, voltage transformers can be provided.

Components ¹	Relay protection			Arc-flash reduction
	Overcurrent	Transformer	Motor	OMARS ²
Siemens 7SJ82 protective relay	■	■		◇
Siemens 7SK82 protective relay			■	
Siemens 7UT8 protective relay		◇		■
Siemens 7UT8 protective relay with arc-flash module				◇
Siemens 7SJ82 protective relay with arc-flash module				◇

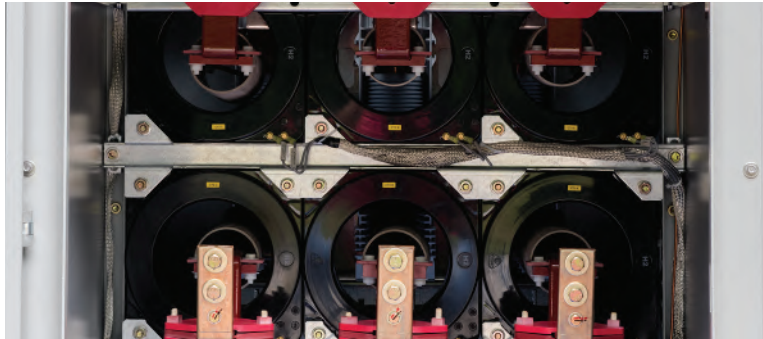
Footnotes:

1. Consult factory for alternate relays and options.
2. ■ Standard features. ◇ Optional features.
3. Refer to pages 34-35 for details on OMARS.



Current transformers

SIEBREAK-VCB switchgear includes current transformers for use with protective relays and power metering. The current transformers are located between the load side of the switch and the line side of the circuit breaker or optionally on the load side of the circuit breaker.



Current transformers located between switch and circuit breaker of a duplex switch

Current transformers					
Ratio	50 Hz metering accuracy at burden				Relay class
	B0.1	B0.5	B0.9	B1.8	
Type MD toroidal standard accuracy					
100:5	2.4	----	----	----	C 15
150:5	0.6	2.4	----	----	C 20
200:5	0.6	1.2	----	----	C 25
250:5	0.6	1.2	----	----	C 35
300:5	0.6	1.2	2.4	----	C 40
400:5	0.3	0.6	2.4	----	C 60
500:5	0.3	0.3	1.2	----	C 75
600:5	0.3	0.3	0.6	----	C 100
800:5	0.3	0.3	0.6	0.6	C 130
1,000:5	0.3	0.3	0.3	0.3	C 170
1,200:5	0.3	0.3	0.3	0.3	C 200

Voltage transformers

SIEBREAK-VCB switchgear is available with voltage transformers as an option for voltage and power metering. The standard location of the voltage transformers is in the front above the switch.



Voltage transformers					
Voltage class kV	Ratio	Accuracy class			VA thermal rating
		X, Y	Z	ZZ	
5	2,400/120	0.3	1.2	----	500
5	4,200/120	0.3	1.2	----	500
5	4,800/120	0.3	1.2	----	500
15	7,200/120	0.3	0.3	1.2	1,000
15	8,400/120	0.3	0.3	1.2	1,000
15	12,000/120	0.3	0.3	1.2	1,000
15	14,400/120	0.3	0.3	1.2	1,000

Voltage transformers located above the switch

Control power transformer

SIEBREAK-VCB switchgear is available with a optional control power transformer up to 15 kVA. When specified, this transformer is typically required to supply power to space-heater circuits, battery systems, lights, and other loads when 120/240 V source is needed.

Control power transformer						
Primary voltage V	Secondary voltage V	Number of phases	Impulse level kV BIL	Thermal ratings ¹		
				5 kVA	10 kVA	15 kVA
2,400	120/240	1	60	√	√	√
4,160	120/240	1	60	√	√	√
4,800	120/240	1	60	√	√	√
7,200	120/240	1	95	√	√	√
8,400	120/240	1	95	√	√	√
12,000	120/240	1	95	√	√	√
12,470	120/240	1	95	√	√	√
13,200	120/240	1	95	√	√	√
13,800	120/240	1	95	√	√	√
14,400	120/240	1	95	√	√	√

Footnote:

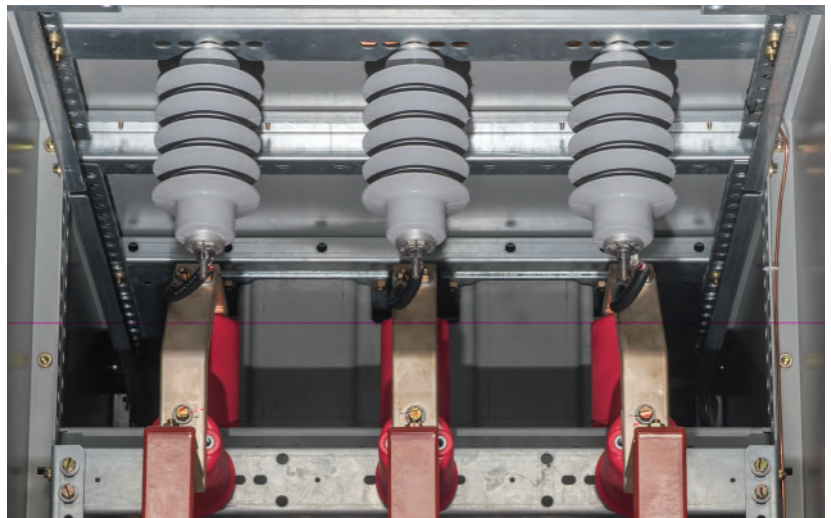
¹. Thermal rating in 86 °F (30 °C) ambient. 86% of rating shown in 131 °F (55 °C) ambient.

Surge protection

SIEBREAK-VCB switchgear is available with optional surge arresters for distribution-, immediate-, or station-class type arresters. Surge arresters comply to IEEE standard C62.11 for Metal-Oxide Surge Arrester for AC Power Circuits (> 1 kV).

The standard location for the surge arresters is in the front above the switch, except when voltage transformers are supplied. In this case, surge arresters are repositioned to the rear.

Optionally, surge limiters can be located on the load side of the circuit breaker.



Station-class surge arresters shown located in the rear when voltage transformers are installed

Metering

SIEBREAK-VCB switchgear is equipped with standard current transformers. Optional voltage transformers can be provided with optional metering devices.



Functional overview (part 1 of 2)					
Instrument variants		Sentron	PAC3100	PAC3200	PAC4200
Basic measurement variables					
Voltage, current			✓	✓	✓
Neutral conductor current			✓	----	✓
Apparent power, active power, reactive power, power factor			✓	✓	✓
Power factor of the fundamental wave			----	----	✓
Frequency	Of the reference phase		✓	✓	✓
Minimum/maximum values	Slave pointer function I with date and time		✓ ----	✓ ----	✓ ✓
Power measurement					
Apparent energy			----	✓	✓
Active energy, reactive energy	Input Output Balance		✓ ✓ ✓	✓ ✓ ----	✓ ✓ ----
Number of tariffs	Apparent, active, and reactive energy		1	2	2
Daily energy values for 365 days	Apparent, active, and reactive energy		----	----	✓
Consumption recording of a sub-process or manufacturing process	Apparent, active, and reactive energy		----	----	✓
Power averages of the last measurement period	Active and reactive power average with minimum/maximum value		✓	✓	✓
Load-profile record			----	----	✓ maximum 3,840 entries ¹
E-counter for S ₀ signal at a digital input	Electrical energy any energy		---- ----	✓ ----	✓ ✓
Accuracy class for active energy	According to IEC 62053-21/62053-22		Class 1	Class 0.5 s	Class 0.2 s
Accuracy class for reactive energy	According to IEC 62053-23		Class 3	Class 2	Class 2
Monitoring of state of the plant and quality of the network					
Configurable displays	For presenting up to 4 measured quantities		----	----	4
Operating hours counter	Operating hours of loads		----	✓	✓
Sliding means values	U, I, S, P, Q, LF		----	----	✓
THD voltage, current			----	THD-R	THD
Distortion current strength			----	----	✓
Phase angle, phase-displacement angle			----	----	✓
Unbalance	Voltage current		----	U _{nba} I _{nba} ²	U _{nb} I _{nb} ³
Harmonics in voltage, current			----	----	3 to 31 st
Limit-value monitoring	Maximum number of limit values		----	6	12
Boolean logic	For limit values inputs		---- ----	✓ ----	✓ ✓
Event memory for operation, control, and system-related events	Including time stamp		----	----	✓ (> 4,000 events)
Battery backup for minimum/maximum values			----	----	✓

Power metering

SIEBREAK-VCB switchgear is available with the optional Siemens SENTRON PAC compact and powerful power-monitoring devices. These devices are compact so they can be mounted on the front door of the SIEBREAK-VCB enclosure. Whether in industrial applications or commercial buildings, the SENTRON PAC power-monitoring devices can be employed wherever electric power is distributed and processed.



Functional overview (part 2 of 2)					
Instrument variants		Sentron	PAC3100	PAC3200	PAC4200
System integration and communication					
Ethernet (integrated)			----	10 Mbits/s	10/100 Mbits/s
• Protocol	Modbus TCP		----	✓	✓
• Gateway	Ethernet ↔ RS485 (Modbus)		----	----	✓ ⁴
Profibus DP (V1)			----	Expansion module optional	
RS485			Integrated	Expansion module optional	
• Protocol	Modbus RTU		✓	✓	✓
4 DI/2 DO expansion module	Expansion to maximum 10 DI/6 DO		----	----	✓ (maximum 2 modules)
Number of expansion modules	Maximum		----	1	2
Integrated digital inputs (DI)	Number I multifunctional		2 I ----	1 I ✓	2 I ✓
Integrated digital outputs (DO)	Number I multifunctional		2 I ✓	1 I ✓	2 I ✓
Installation plan					
Dimensions (length x width x depth)	In in. (mm)		3.78 x 3.78 x 2.20 (96 x 96 x 56)	3.78 x 3.78 x 2.20 (96 x 96 x 56)	3.78 x 3.78 x 3.23 (96 x 96 x 82)
Mounting depth	PAC PAC with expansion module in in. (mm)		2.01 (51) ----	2.01 (51) 2.87 (73)	3.03 (77) 3.90 (99)
Panel cut out (length x width)	In in. (mm)		3.62 x 3.62 (92 x 92)	3.62 x 3.62 (92 x 92)	3.62 x 3.62 (92 x 92)
Standards and approvals					
UL / cUL			✓	✓	✓
IEC 61557-12			✓	----	✓

Footnotes:

1. This corresponds, for example, to a duration of 40 days with a measurement period of 15 minutes.
2. $U_{nba} - I_{nba}$ - Unbalance with regard to amplitude.
3. $U_{nb} - I_{nb}$ - Unbalance with regard to amplitude and phase.
4. In conjunction with SENTRON PAC RS485 expansion module.
5. ✓ Available --- Unavailable

Operation and maintenance arc-flash reduction system (OMARS)

SIEBREAK-VCB configuration in low-voltage or medium-voltage substations

SIEBREAK-VCB is available in four advanced configurations for reducing the incident arc-fault energy on the secondary bus of substation:

Components ¹	Low-voltage circuit breaker configuration ²		Virtual main configuration ²	
	#1	#3	#2	#4
Siemens 7UT8 protective relay	■	■	■	■
Siemens 7UT8 protective relay with arc-flash module	◇	◇	◇	◇
Siemens 7SJ82 protective relay	◇	◇	◇	◇
Siemens 7SJ82 protective relay with arc-flash module	◇	◇	◇	◇

Footnotes:

1. Consult factory for alternate relays and options.
2. ■ Standard features. ◇ Optional features.

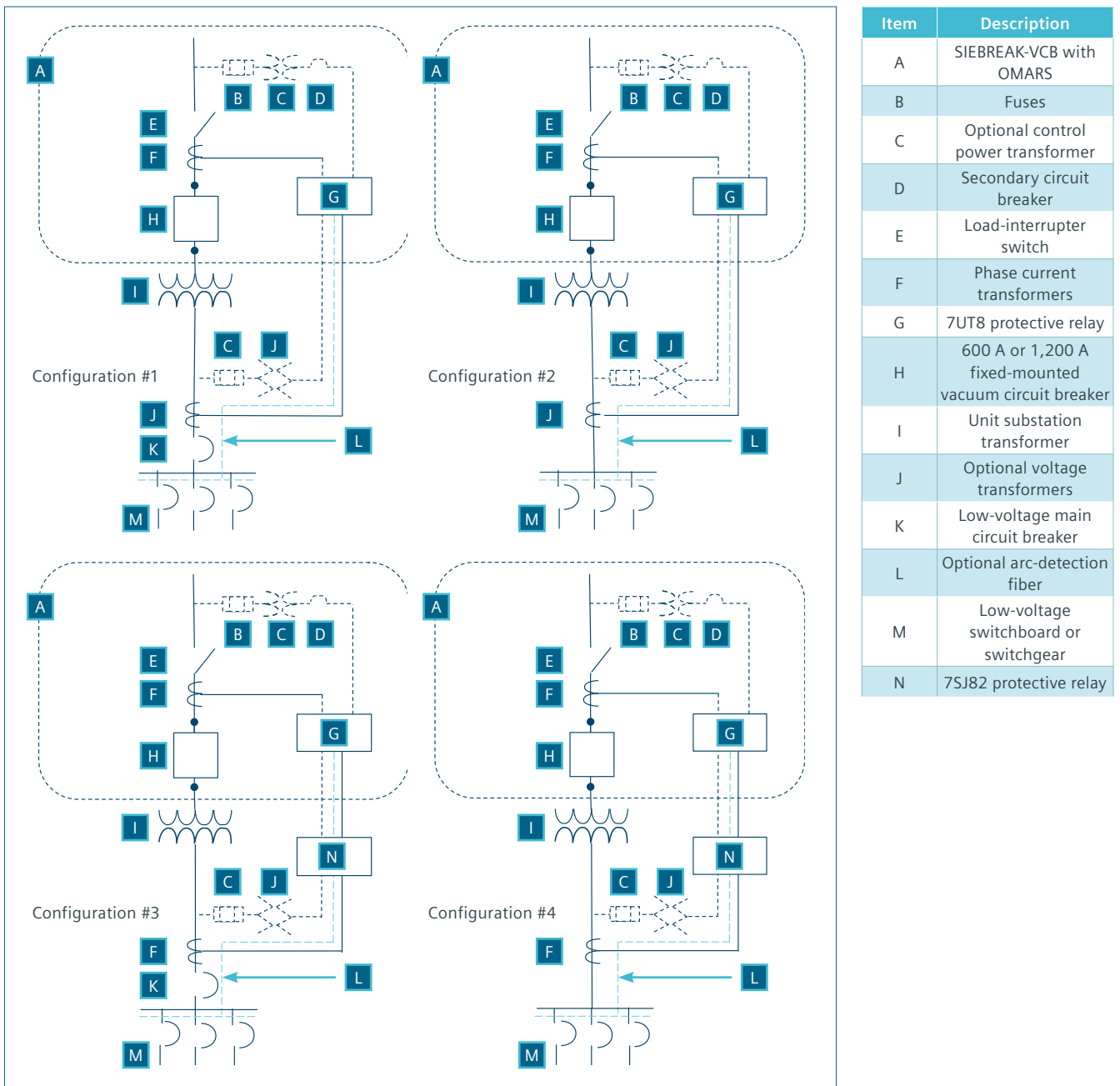


Configurations #1 and #3: Low-voltage circuit breaker configurations

SIEBREAK-VCB equipped with a Siemens 7UT8 transformer differential protective relay along with an additional set of current transformers located in the auxiliary compartment of the low-voltage equipment provides a reliable system for reducing the incident energy on the secondary bus thus reducing the arc-flash hazard in this area. Optionally, the protective relay can be equipped with an arc-flash detection module for additional arc-flash protection and mitigation.

Configurations #2 and #4: Virtual main configuration

Same as configurations #1 and #3 except the low-voltage equipment is installed remote from the SIEBREAK-VCB panel. The current transformers in the low-voltage auxiliary compartment will be hardwired directly to the 7UT8 protective relay in the SIEBREAK-VCB panel. The type Siemens 7SJ82 protective relay located in the low-voltage switchgear or switchboard is used primarily for the optional arc-flash detection system to transfer the trip signal to the 7UT8 protective relay. For this option, the 7SJ82 protective relay connection is hardwired or fiber-optic cable connected to the 7UT8 protective relay located in the SIEBREAK-VCB panel. The type or connection is depended upon the customer's preference to run hardwires or fiber-optic cables. In most cases, the decision on whether to use hardwire or fiber optic is based on various factors. Please consult factory.



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For more information, including service or parts,
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