



The quality you can trust.

SIMOPRIME A4

Medium-Voltage Switchgear up to 24 kV

Manufactured by MANTRA SWITCHGEAR CO., LTD.

Licensed Partner of SIEMENS

Approved
Partner

SIVACON S8
SIMOPRIME A4

SIEMENS

SIEMENS SIMOPRIME 24 kV (MV Switchgear up to 24 kV) by MANTRA -- Licensed Partner



SIEMENS SIMOPRIME 24kV

Medium-Voltage Switchgear up to 24 kV





Application

Benefits (see also page 11 for details)

- Saves lives
- Peace of mind
- Increases productivity
- Saves money

The circuit-breaker switchgear type SIMOPRIME 24kV

- is a factory-assembled, type-tested switchgear for indoor installation according to IEC 62271-200
- Use of high quality worldwide available components
- Design based on global best practice and 50 years of experience (Siemens)

SIMOPRIME 24kV panel

Maximum ratings 24 kV/25 kA/2500A

Typical uses

The SIMOPRIME 24kV circuit-breaker switchgear can be used in transformer and switching substations.

Application: Power supply system

- Power supply companies

Application: Industry

- Power stations
- Cement industry
- Automobile industry
- Iron and steel work
- Rolling mills
- Mining industry
- Textile, paper and food industries
- Chemical industry
- Petroleum industry
- Pipeline installations
- Offshore installations
- Electrochemical plants
- Petrochemical plants
- Shipbuilding industry
- Diesel power supply installations
- Emergency power supply installations
- Lignite open-cast mines
- Traction power supplies

Typical Uses



- Application
Public power
supply system

- SIMOPRIME switchgear



- Application
Industry

Technical Data

Ratings

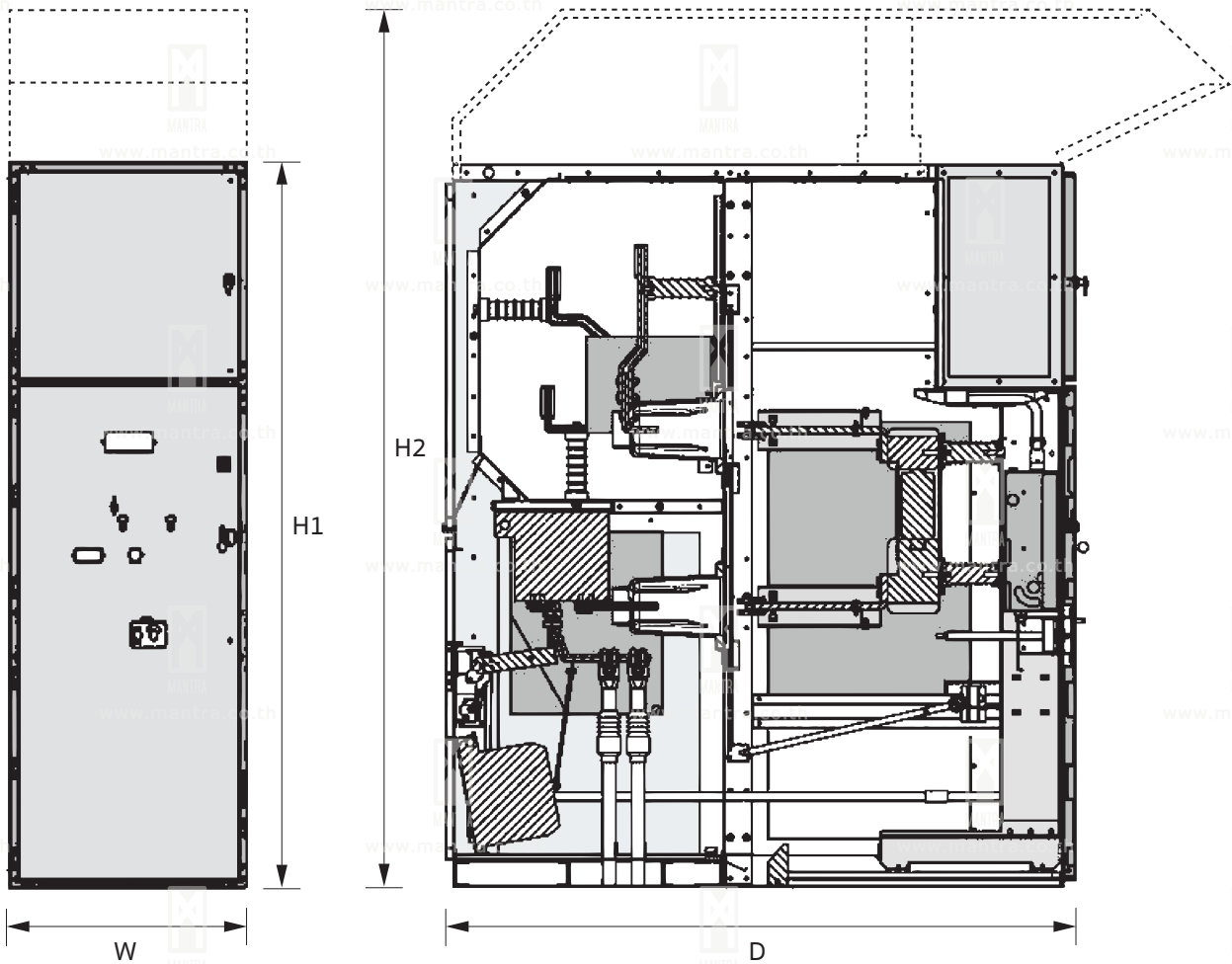
Electrical data (maximum values) of SIMOPRIME A4

Ratings (max.)	Rated values
Switchgear up to 24kV	
Rated voltage	24 kV
Rated frequency	50/60 Hz
Rated short-duration power- frequency withstand voltage	50 kV
Rated light impulse withstand voltage	125 kV
Rated short-time withstand current, 3 s	25 kA
Rated peak withstand current at 50/60 Hz	63 kA
Rated short-circuit breaking current	25 kA
Rated short-circuit making current at 50/60 Hz	63 kA
Rated normal current of busbar	2500A
Rated normal current of feeders	2500A
- with circuit-breaker	max 200A
- with fused load break switch	Limited by fuse Rating

Classification of the SIMOPRIME A4 switchgear according to IEC 62 271-200

Resistance to internal arcs			Construction and design	
Classification		IAC	Class of partitions	PM (metallic partition)
Accessibility			Service continuity category	LSC2B (metalclad)
- Front		Type A	Compartment accessibility (standard)	
- Rear		Type A	- Busbar compartment	Tool-based
- Lateral		Type A	- Switching-device compartment	Interlock based
Test current	kA	25	- Low-voltage compartment	Tool-based
Test duration	s	1.0	- Connection compartment	
			Front connection	Interlock-based and Tool-based
			Rear connection	Tool-based

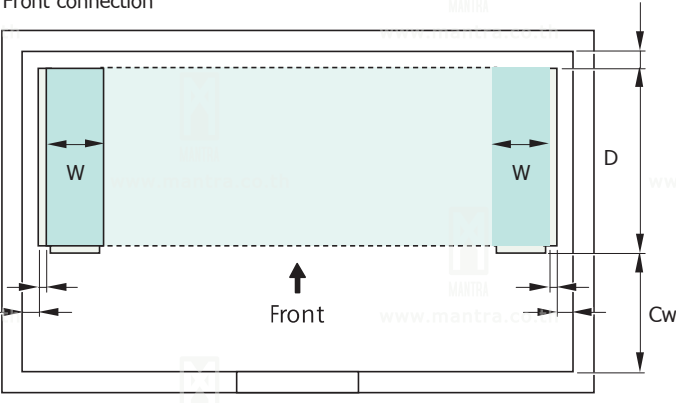
Dimensions



All panel types		Dimensions in mm
Width W	For 1250 A vacuum circuit-breaker	800
	For 2500 A vacuum circuit-breaker	1000
	For load-break switch	500
Height H1/H2	With standard low-voltage compartment/with additional PRC for IAC 1 sec	2250/2728
Depth D	standard	1900

Room planning (minimum room height W 2850 mm)

Front connection

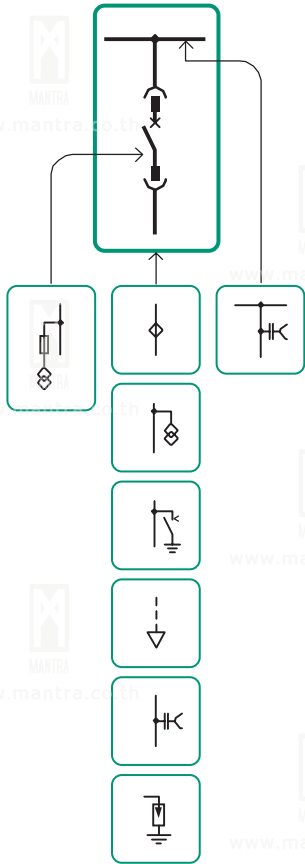


- Single-row arrangement (plan view)
- For dimensions W (width) and D (depth) refer to table above
- 1) For panel replacement: Control aisle W 2000 mm (Cw)
- 2) Minimum distance to wall 150 mm

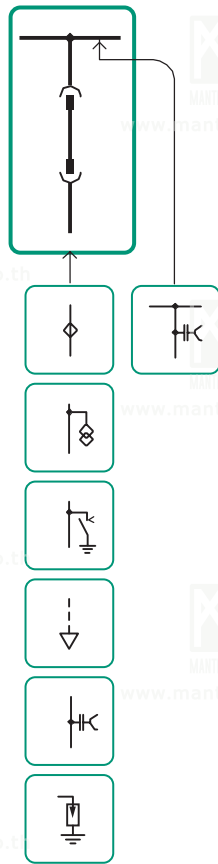
Product Range

Panels

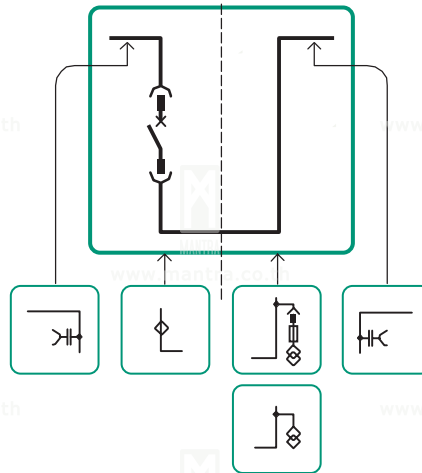
Circuit-breaker panel



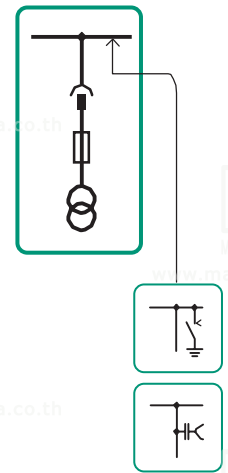
Disconnecting panel



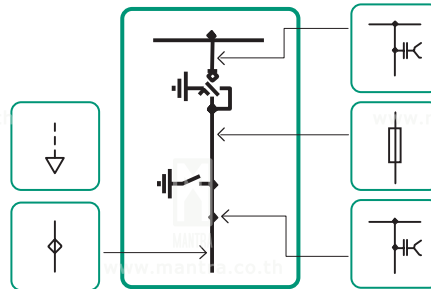
Bus sectionalizer
(mirror-image installation also possible)



Metering panel



Load-break switch panel



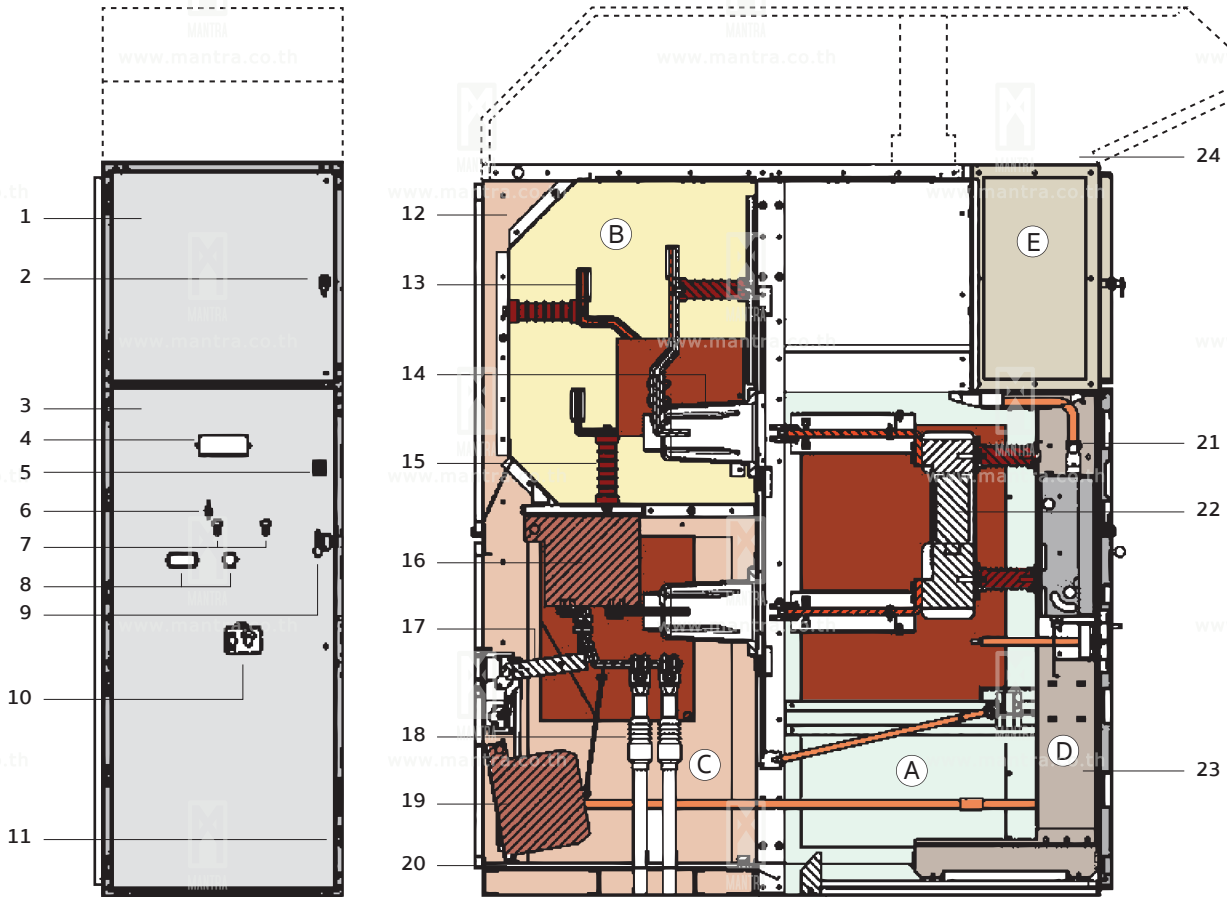
Components

	Current transformer		Withdrawable voltage transformer with primary fuses		HV HRC fuse
	Voltage transformer without primary fuses		Make-proof earthing switch		3AH5 vacuum circuit-breaker
	Voltage transformer with primary fuses		Disconnection link or dummy truck		Three-position Switch-disconnector
	Capacitive voltage detecting system		Cable sealing ends ¹⁾ max. 4 x 500 mm ² per phase		Surge arrestor

1) The details refer to conventional RXS single core sealing ends for XLPE cables or other makes with similar dimensions.

Design

Basic panel design (example)



Circuit-breaker panel

Design :

Connection from front with block current transformer

Panel design

Legend for panel design :

- | | |
|--|---|
| 1. Door of low-voltage compartment | 16. Block-type current transformers |
| 2. Handle for locking or unlocking the low- voltage compartment door | 17. Option : Make-proof earthing switch |
| 3. High-voltage door of switching-device compartment | 18. Cable sealing ends |
| 4. Inspection window for checking the switching-device truck | 19. Option : Voltage transformer |
| 5. Opening for locking or unlocking the high-voltage door | 20. Earthing busbar |
| 6. Opening for mechanical charging of circuit-breaker | 21. Low-voltage plug connector |
| 7. Openings for manual operation (ON/OFF) of the circuit-breaker | 22. Vacuum interrupters |
| 8. Inspection window for reading the indicators | 23. Switching-device truck |
| 9. Door knob | 24. Pressure relief Channel |
| 10. Opening for switching-device truck operation | A - Switching Device compartment |
| 11. Opening for earthing-switch operation | B - Busbar compartment |
| 12. Pressure relief duct | C - Connection compartment |
| 13. Busbars | D - VCB Truck |
| 14. Bushing | E - Low-voltage compartment |
| 15. Post insulators | |

A : Switching - device Compartment

- All switching operations with high-voltage door closed
- Pressure relief upwards
- Shutter operation mechanism separately for
 - Busbar bushing
 - Connecting bushings
- Metallic, earthed shutters and partitions ensure partition class PM
- High-voltage door pressure resistant in the event of internal arcs in the panel
- Metallic ducts for laying control cables
- Interlocking between high-voltage door and circuit-breaker truck ensures interlock-based access
- Switching- device compartment to accommodate components for implementing various panel versions with
 - Vacuum circuit-breaker with or without voltage transformers on the truck
 - Disconnecter truck
 - Metering truck

B : Busbar compartment

- Pressure relief upwards and through rear pressure relief duct.
- [Option](#) : Bubar transverse partition between panels
- Busbars made of flat copper, bolted from panel to panel
 - For rated nominal currents up to 2500 A
- [Option](#) : Insulated busbars
- Bolted top covers provide tool-based access
- [Option](#) : Coupling electrode for capacitive voltage detection system

C : Connection compartment

- Pressure relief upwards through rear pressure relief duct
- Suitable for connection of
 - Single-core XLPE cables up to max. 4x500 mm² per phase
 - Three-core XLPE cables up to max. 3x300 mm² per phase
- Independent opening shutters to permit cable testing
- Earthing busbar
- Connection from front
- Use of block-type current transformers
- Interlocked high-voltage door and bolted partitions between connection compartment and switching-device compartment provide interlock-based and tool-based access for panels with connection from front
- Coupling electrode for capacitive voltage detection system
- Voltage transformers
 - Cast -resin insulated
 - Max.3x1-pole
 - Fixed-mounted, without primary fuses
- Make-proof earthing switch
 - With manual operating mechanism
 - In addition to standard inter-locking of earthing switch/circuit-breaker truck, optionally lockable or with electromagnetic interlock
- Surge arresters
 - Surge arresters for protecting the switchgear against external overvoltages

Interlocks

- Interlocking conditions are satisfied according to IEC 62 271-200/ VDE 0671-200
- Earthing switch can only be operated with circuit-breaker truck in test position
- Circuit-breaker truck can only be moved with circuit-breaker "OPEN" and earthing switch "OPEN"
- Mechanical coding on the circuit-breaker truck prevents insertion of similar circuit-breaker truck for lower rated nominal current into panels with higher rated nominal current
- Interlocking of high-voltage door against circuit-breaker truck
- The high-voltage door can only be opened when the circuit-breaker truck is in test position
- [Option](#) : Electromagnetic interlocks

E : Low-voltage compartment

- Accommodates equipment for protection, control, measuring and metering
- Partitioned from the high-voltage part of the panel, safe-to-touch
- Low voltage compartment can be removed Buswires & control cables are Plugin type.
- Control cables in the HV compartments are routed in metallic flexible conduits and metallic covers
- Connection between switching device truck and panel wiring to low-voltage compartment via 64-pole coded plug connectors
- [Option](#) : Flame retardant & LSOH control wiring.
- Panels painted with epoxy resin powder coating. Standard shade : RAL7035 Other shades as OPTION

Benefits and features

Benefits	Features
 Saves lives	■ All switching operations including emergency manual operations with high-voltage door closed ■ Interlocking between high-voltage door and switching device ■ Rack-in, rack-out operations of the circuit-breaker truck with high-voltage door closed ■ Metallic, earthed shutters and partitions, partition class: PM ■ Internal arc tested design up to 25 kA, 1s, according to IEC 62 271-200, Annex A ■ Use of vacuum circuit-breakers
 Peace of mind	■ Factory- assembled, type-tested switchgear according to IEC 62 271-200 ■ Type testing of the circuit-breaker inside the panel ■ Use of standard, worldwide available components ■ Use of maintenance-free vacuum circuit-breaker ■ Quality management according to DIN EN ISO 9001 ■ Design based on global best practice sharing and experience ■ More than 300,000 air-insulated switchgear panels from Siemens in operation world-wide
 Increases productivity	■ Use of metallic, earthed shutters and partitions between the compartments ensures highest service continuity of the switchgear(LSC2B according to IEC 62 271-200) during maintenance ■ Use of maintenance-free vacuum circuit-breakers
 Saves money	■ Use of maintenance-free vacuum circuit-breakers

Truck-type design



Standards

The switchgear complies with the relevant standards and specification applicable at the time of type tests

Type of service location

The switchgear can be used for indoor installation in accordance with IEC 61 936(Power installations exceeding 1kV AC) and VDE 0101

- Outside lockable electrical service location at places which are not accessible to the public. Enclosures of switchgear can only be removed with tools.
- Inside lockable electrical service locations. A lockable electrical service location is a place outdoors or indoors that is reserved exclusively for housing electrical equipment and which is kept under lock and key. Access is restricted to authorized personnel and persons who have been properly instructed in electrical engineering. Untrained or unskilled persons may only enter under the supervision of authorized personnel or properly instructed persons.

Tems

"Make-proof earthing switches"
are earthing switches with short-circuit-making capacity according to

- IEC 62 271-102 and
- VDE 0671-102/ EN 62 271-102

Current-carrying capacity

- According to IEC 62271-1/VDE 0671-1 and IEC 62271-200/ VDE 0671-200 current-carrying capacities refer to the following ambient air temperatures:
 - Maximum of 24-hour mean +35 °C
 - Maximum +40 °C
- The current-carrying capacity of the panels and busbars depends on the ambient air temperature outside the enclosure.
- To attain the maximum rated normal currents, the panels are provided with natural or forced ventilation.

Overview of standards

	IEC standard	VDE standard	DIN / EN standard
SIMOPRIME Switchgear	IEC 62271-1 IEC 62271-200	VDE 0671-1 VDE 0671-200	DIN / EN 62271-1 DIN / EN 62271-200
Devices	Internal arcing tests	IEC 62271-200	VDE 0671-200
	Circuit breaker	IEC 62271-100	VDE 0671-100
	Vacuum contactor	IEC 60470	VDE 0670-501
	Disconnecter and earthing switch	IEC 62271-102	VDE 0671-102
	HV HRC fuses	IEC 60282	VDE 0670-4
	Voltage detecting systems	IEC 661243-5	VDE 0682-415
	Internal arc classification	IEC 62271-200	VDE 0671-200
Degree of protection	IEC 60529	VDE 0470-1	DIN / EN 61243-5
	IEC 62271-200	VDE 0671-200	DIN / EN 60529
Current-carrying capacity	IEC 62271-1	VDE 0670-1	DIN / EN 62271-1
	IEC 62271-200 ¹⁾	VDE 0671-200 ¹⁾	DIN / EN 62271-200 ¹⁾
Insulation	IEC 60071	VDE 0111	DIN / EN 61869-2
Current transformer	IEC 61869-2	VDE 0414-1	DIN / EN 61869-3
Voltage transformer	IEC 61869-3	VDE 0414-2	DIN / EN 61936-1
Installation	IEC 62271	VDE 0101	-
Enclosure	IP 4X ²⁾ (protection against solid foreign bodies) Compartments: IP 2X (protection against solid foreign bodies)		

¹⁾ Ambient air temperatures: Maximum of 24 H mean + 35 °C | Maximum + 40 °C
 - The current-carrying capacity of the panels and busbars depends on the ambient air temperature outside the enclosures.
 - To attain the maximum rated normal currents, the panels are provided with natural or forced ventilation.
²⁾ Higher degree of protection IP 5x for enclosures on request.

Table-Insulating capacity

Rated voltage (rms value)	kV	24
Rated short-duration power-frequency withstand voltage (rms value)		
• Across isolating distances	kV	60
• Between phases and to earth	kV	50
Rated lightning impulse withstand voltage (peak value)		
• Across isolating distances	kV	145
• Between phases and to earth	kV	125

Climate and ambient conditions

The switchgear may be used, subject to possible additional measures, under the following ambient conditions and climate classes:

Ambient conditions

- Natural foreign materials
- Chemically active pollutants
- Small animals

Climate classes

- 3K3
- 3K5

The climate classes are classified according to IEC 60 721-3-3.

Protection against solid foreign bodies, electric shock and ingress of water SIMOPRIME switchgear fulfills acc. To the standards

- IEC 62 271-200
- IEC 60 529
- VDE 0470-1
- VDE 0671-200

The following degrees of protection:

- Enclosure IP4X
- Compartments IP2X

Resistance to internal arc faults

- Safety of operating personnel ensured by test to verify resistance to internal arc faults.
- Internal arc test in accordance with IEC 62271-200/VDE 0671-200
- The switchgear complies with criteria 1 up 5 specified in the mentioned standards for the basic version up to 25kA.
- Definitions of the criteria :
 - Criterion 1
Correctly secured doors and covers do not open. Limited Deformations are accepted.
 - Criterion 2
No fragmentation of enclosures occurs with in the time specified for test. Projections of small parts up to 60 g are accepted.
 - Criterion 3
Arcing does not cause holes in the accessible sides up to a height of 2 m.
 - Criterion 4
Indicators do not ignite due to the effect of hot gases.
 - Criterion 5
The enclosure remains connected to its earthing point.

Notes

If not stated otherwise on the individual pages of this catalog, we reserve the right to include modifications, especially regarding the stated values, dimensions and weights. Drawings are not binding.

All product designations used are trademarks or product name of Siemens AG or other suppliers.

If not stated otherwise, all dimensions in this catalog are given in mm.

The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases.

The required features should therefore be specified in each individual case at the time of closing the contract.

Certificate



Certificate

SIMOPRIME Technology Partner

Siemens AG
Smart Infrastructure
Electrification & Automation

Mantra Switchgear Co., Ltd.

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Amphur Bangplee, 10540 Samutprakarm/Bangkok, Thailand

is a certified SIMOPRIME Technology Partner.

In the context of the technical cooperation and license agreement the company is qualified and authorized to manufacture type-tested medium voltage switchgear based on type

SIMOPRIME World (7.2 - 17.5 kV) and SIMOPRIME A4 (24kV)

The certificate is valid until 31.08.2024.

Electronically signed by:
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Date: Aug 25, 2022 14:30
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CEO SIEA

Electronically signed by:
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