SIEMENS

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Reliable Solution for Power Distribution

Air-Insulated Medium-Voltage Switchgear: Cost-Efficient, Sustainable and Safe

Answers for infrastructure and cities.

Contents

Air-insulated medium-voltage switchgear from Siemens

The clever solution ...

Medium-voltage grids are facing great challenges worldwide: On the one hand, energy demand is increasing due to continuous growth of population, progressive urbanization and industrialization, as well as new tasks such as electromobility. On the other hand, more and more power from renewable sources must be supplied to the grids via the medium-voltage level in order to reach the ambitious climate targets.

That is why modern medium-voltage switchgear must not only be environmentally compatible, sustainable and safe, but also cost-efficient, reliable and intelligent, e.g. by allowing integration into higher-level control and protection systems. With Siemens, you have a competent partner by your side for all these questions.

Air-insulated medium-voltage switchgear from Siemens is the clever solution – for the challenges of today and tomorrow.

Your benefits at a glance

- Comprehensive supply of air-insulated switchgear for primary distribution grids
- High cost-efficiency by modular design and use of maintenance-free circuit-breakers
- High switchgear availability and personal safety
- Contribution to sustainability by environmentally neutral insulating medium
- High security of investment by optional integration in smart distribution grids
- High product quality from Siemens, one of the pioneers of air-insulated switchgear
- Reliable and competent support on site – from planning to operation

The powerful centerpiece of your medium-voltage grid

Flexibility, reliability, maximum personal safety, and low costs for operation and maintenance: Air-insulated medium-voltage switchgear from Siemens is the ideal system for the primary distribution level in industry and infrastructure, or for utilities.

As a globally leading technology company, we are also fostering the development of air-insulated switchgear today, offering all switchgear with type tests according to IEC 62271-200 or ANSI/IEEE C37.20.2. Environmentally compatible, sustainable and especially safe, this switchgear can be easily integrated in higher-level control and protection or energy management systems, or in Smart Grids.

Security for utilities

Our air-insulated medium-voltage switchgear combines high personal and operational safety with excellent cost efficiency: Maintenance-free vacuum circuit-breakers and easily replaceable withdrawable parts reduce downtimes and increase availability. In addition, with our strategically distributed production centers we are close to you worldwide, and we can also integrate local know-how into our switchgear according to the different requirements from country to country.

Cost efficiency for the chemical industry

Uninterrupted power supply, also under aggressive atmosphere, is indispensable for the chemical industry to guarantee stable processes. This is a task for our reliable air-insulated medium-voltage switchgear. The advantage: Secure supply of large consumers and low-voltage switchboards ensures long-term system availability and security of investment throughout the entire life cycle.

High availability for the automobile industry

Globally operating automobile manufacturers need highly flexible, profitable and maximally available production lines, as every minute of standstill of the belt causes high costs. Therefore, a reliable power distribution is crucial for success. For our air-insulated medium-voltage switchgear, maintenance-free vacuum circuit-breakers and maintenance intervals of more than ten years provide optimum availability values.

In addition, modular design and standardized elements allow for the quick replacement of individual components as well as easy extension, for example during the modernization of your production.

Secure supply in the data center

Data centers belong to the largest energy consumers worldwide. For this purpose, maximum availability is required – and therefore reliable power supply around the clock. Faults or breakdowns for sure mean interruptions of operation and data loss – as well as unforeseeable financial consequences. Our well-proven air-insulated medium-voltage switchgear provides a secure and reliable supply of your data center, allowing integration in modern infrastructure thanks to its compact design.

Hardest conditions in the oil and gas industry

The global demand for oil and gas continues increasing, but new deposits are found more and more in rough, harsh regions of the Arctic Zone or in deep sea. Offshore platforms require vibration- and shock-tested switchgear with a high degree of protection. Therefore, the requirements on power supply are even higher. Thanks to the maintenance-free circuit-breaker and the modular, solid design, air-insulated medium-voltage switchgear from Siemens is an important component for smooth and cost-efficient operation without expensive downtimes.

Cost-efficient production processes in mining applications or in the metal industry

Also in mining applications and in the metal industry, safe and reliable, highly available power supply is indispensable: High currents, e.g. for the supply of electric arc furnaces, and a large number of operating cycles are typical. Our especially safe air-insulated medium-voltage switchgear meets these requirements with its maintenance-free circuit-breakers, also used as increased-frequency circuit-breakers with a large number of operating cycles, and the maintenance-friendly withdrawable design as well as a high short-time withstand current.

Reliable in the paper and pulp industry

Increasing cost pressure in aggressive competition, highest demands on quality and availability – power supply in the paper industry must reliably accomplish complex tasks. Air-insulated switchgear from Siemens supports you in this, delivering electricity in the range of a hundred megawatt hours safely, reliably and cost-efficiently to the different consumers – at peak load.

In other branches such as the food and beverage industry, air-insulated switchgear from Siemens puts energy under your control. Allow yourself to be convinced of the benefits of air-insulated medium-voltage switchgear.

A class of itself

At a time of growing cost and performance pressure it is even more important to decide on the right technology, above all because switchgear represents an investment for the next decades.

Therefore, the profile of our air-insulated medium-voltage switchgear is clear: A maximum degree of safety, reliability and availability. In this way, our well-proven technology enables cost-efficient and reliable operation, and also fully exploits its strengths regarding sustainability, because air-insulated switchgear is environmentally neutral.

Security of operation

Air-insulated switchgear from Siemens is type-tested and fulfills the standard IEC 62271-200. Most modern production processes and quality standards provide for reliable operation of the switchgear.

For us, optimum security of operation starts with functions such as the verification of the making and breaking capacity of the circuit-breaker and earthing switch integrated in the panel, and even with the verification of the confinement of an internal arc to the respective compartment, depending on the switchgear type.

Measures taken to meet the requirements regarding the optimum degree of protection, as well as a modular design and the use of standardized components allow for uninterrupted operation and a sustainable increase of productivity.

Personal safety

Every air-insulated switchgear from Siemens for the IEC market is approved with internal arc classification IAC A FLR, and with loss of service continuity category LSC 2B, LSC 2A or LSC1 depending on the switchgear type, as well as with partition class PM. This makes the equipment suitable for universal installation, satisfying the highest requirements regarding personal safety.

The safety concept is completed with a comprehensive logical mechanical interlocking system which protects against maloperation. All switching operations are possible only with closed high-voltage door, on which unambiguous position indicators and control elements support safe operation.

In this way, air-insulated switchgear from Siemens offers a well-proven, safe design with vacuum circuit-breakers and racking of the circuit-breaker truck with closed high-voltage door, as well as a degree of protection of up to IP51, metal enclosure and earthed shutters and partitions.

Cost-efficient

A service life of more than 30 years not only optimizes the energy balance, but also makes our air-insulated switchgear a cost-efficient investment. The compact design of our air-insulated medium-voltage switchgear and the use of the vacuum circuit-breakers pays off twice for you. On the one hand, building costs are reduced due to minimum space requirements, and on the other hand, the maintenance-free design of the circuit-breaker enables largely continuous operation without expensive downtimes.

In addition, the modular and withdrawable design of our switchgear accelerates repairs, e.g. by means of withdrawable vacuum circuit-breakers or vacuum contactors. Well-accessible cable connections reduce the assembly times and save installation costs. Cable testing can be done easily and quickly.

Intelligent

Today, medium-voltage switchgear must not just offer safe and reliable power distribution. In times of energy efficiency and Smart Grids, it also has the task to acquire and transmit measured values and data about actual states from the panel level, in order to enable their evaluation in a higher-level control center.

For this purpose, our switchgear can be equipped with built-in telecontrol units; integration in control and protection systems and Smart Grids can be implemented via several protocols (such as IEC 61850, PROFIBUS, MODBUS, DNP).

Depending on the level of the Smart Grid functionality, more benefits result, such as high availability, fast localization of faults, early detection of overload situations, safe operational management. Moreover, load characteristics can be recorded and used for optimal planning of grid expansions.

Sustainable

The great advantage of air-insulated medium-voltage switchgear: The insulating medium air is available always and everywhere, without further technical efforts, such as for example gas pressure monitoring.

This switchgear concept has been well-proven for decades, and represents the most environmentally compatible solution for medium-voltage switchgear: If there is no need to use special insulation gases, those cannot escape either; not to mention the contribution to the greenhouse effect.

Reliable

Development and production of our air-insulated medium-voltage switchgear is done worldwide based on the same high quality and environmental standards. Thereby, our customers benefit from the most modern tools in development and production, which allow for maximum quality and reliability of the systems.

An example for this is the consequent use of 3D-CAD software, which transfers your data directly from the purchase order through the design department to the production, in order to become a switchgear ready for operation within a short time.

Of course, the high quality of our air-insulated switchgear is ensured in our highly-modern, accredited testing and experimental laboratories. Besides type and routine tests of the individual type series, a quality assurance system according to DIN EN ISO 9001 and 14001 accompanies the process. Our testing laboratories range among the largest in the world, and have the status of independent testing institutes because of their affiliation to PEHLA and DAR.

Local creation of value – country-specific flexibility

Our air-insulated medium-voltage switchgear type series is developed and manufactured by international teams in the different regions of the world, with a regular exchange of information. In this way we do not only safeguard the local know-how for the different requirements from country to country, but also the transfer of experiences from other locations.

All production processes are documented in a comprehensible way in order to reach the quality level our customers can expect in a fast, secure and reproducible way.

Reliable support on site

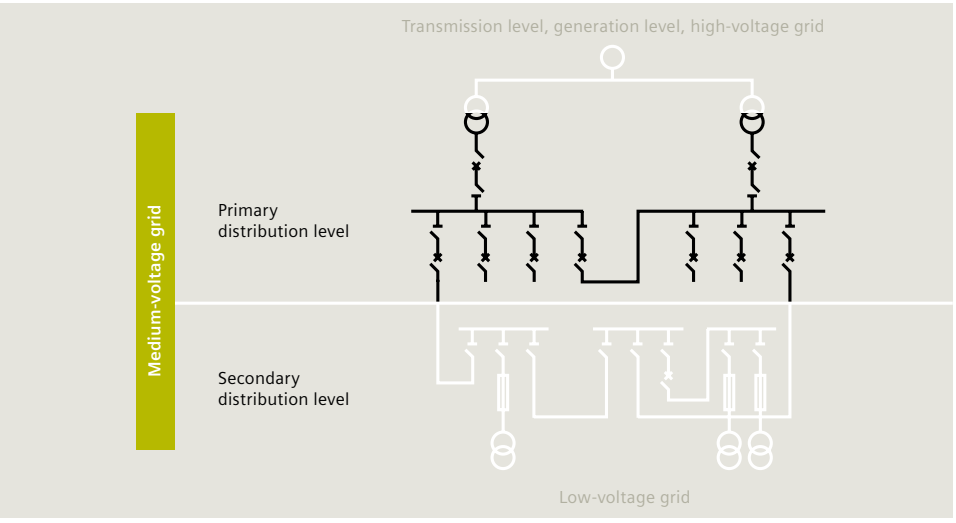
Our experts support you worldwide, and advise you, as our customer, to develop optimum solutions for your power distribution grid. In this context you will benefit, for example, not only from our know-how in project management and our financial services, but also from our experienced customer account managers, who consider all relevant aspects to the topics safety, logistics and environmental protection in their quotation.

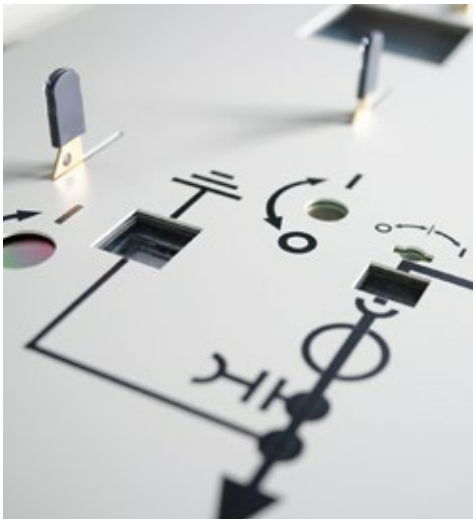
Especially in the planning phase, our experts from Totally Integrated Power (TIP) will accompany you with professional consulting, software tools, specification texts and planning manuals.

Portfolio overview

Your region, your requirements – and the matching solution from Siemens.

At the same time, our matrix is your guide to the right air-insulated medium-voltage switchgear from Siemens. In accordance with the relevant IEC, GB/DL or ANSI standards you will find the suitable offer to your requirements at one glance by selecting the appropriate combination of busbar system, as well as the basic electrical parameters.





Selection matrix				Electrical data (max.)																Page
Standard	Distribution level	Busbar system	Switchgear type	U_r [kV]								I_k [kA]							I_{busbar} [A]	I_{feeder} [A]	
				7.2	12	15	17.5	24	27.5	36	40.5	20	25	31.5	40	44	50	63			
IEC	Primary distribution level	Single	8BT2	■	■	■	■	■	■	■		■	■	■					3150	3150	14
			8BT1	■	■	■	■	■				■	■						2000	2000	14
			NXAIR	■	■	■	■	■				■	■						2500	2500	12
				■	■	■	■					■	■	■	■				4000	4000	12
			NXAIR P	■	■	■	■					■	■	■	■	■	■		4000	4000	12
			8BK80	■	■	■	■	■	■	■		■	■	■					3150	2500	15
				■	■							■	■	■	■	■			4000	3150	15
			8BK88 PLUS[1)]	■	■							■	■						2000	1450	15
	Primary distribution level	Double	NXAIR	■	■	■	■	■				■	■						2500	2500	12
GB/DL	Primary distribution level	Single	NXAIR S	■	■	■	■	■				■	■	■					3150	3150	13
				■	■							■	■	■	■				4000	4000	13

Selection matrix				Electrical data (max.)															Page
Standard	Distribution level	Busbar system	Switchgear type	U_r [kV]							I_k [kA]							I_{busbar} [A]	I_{feeder} [A]	
				7.2	13.8	15.0	27.6	38	40.5		20	25	31.5	40	44	50	63			
ANSI	Primary distribution level	Single	GM38	■	■	■	■	■			■	■	■					3000	3000	16
			GM-SG-AR	■	■	■					■	■	■	■	■	■		4000	4000	16
			GM-SG	■	■	■					■	■	■	■	■	■	■	4000	4000	16
			SIMOVAC-AR	■							■	■	■	■	■	■	■	4000	720	17
			SIMOVAC-NAR	■							■	■	■	■	■	■	■	4000	720	17

1) Short-time withstand current up to 26.3 kA

NXAIR, NXAIR P

High-end technology in best form

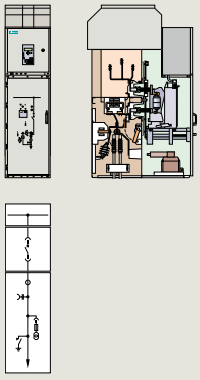
Technical features	NXAIR	NXAIR	NXAIR P
Rated values up to	**17.5 kV, 40 kA, 3 s**	**24 kV, 25 kA, 3 s**	**17.5 kV, 50 kA, 3 s**
Busbar current up to	4000 A	2500 A	4000 A
Feeder current up to	4000 A	2500 A	4000 A
Busbars	Single busbar	Single and double busbar	Single busbar
Insulation	Air-insulated		
Type of switchgear	Factory-assembled, type-tested, metal-enclosed switchgear according to IEC 62271-200 Modular and extendable as individual panels		
Classification according to IEC 62271-200			
Partition class	PM		
Loss of service continuity category	LSC 2B		
Accessibility to compartments	Busbar compartment:	Tool-based	
	Switching-device compartment:	Interlock-controlled	
	Cable compartment:	Interlock-controlled or tool-based	
Internal arc classification	IAC A FLR 40 kA, 1 s	IAC A FLR 25 kA, 1 s	IAC A FLR 50 kA, 1 s
Dimensions			
Panel width	435 mm, 600 mm, 800 mm, 1000 mm	800 mm, 1000 mm	400 mm, 800 mm, 1000 mm
Panel height	2300 mm	2560 mm	2550 mm
Panel depth	1350 mm, 1400 mm, 1500 mm, 1540 mm	1600 mm	1635 mm, 1650 mm

For further information, see catalog HA 25.71

Product range (in excerpts)

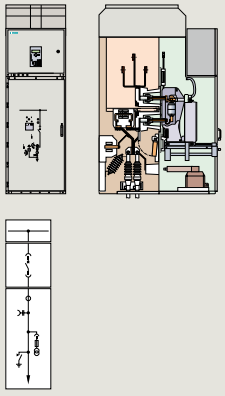
Circuit-breaker panel

NXAIR ≤ 17.5 kV



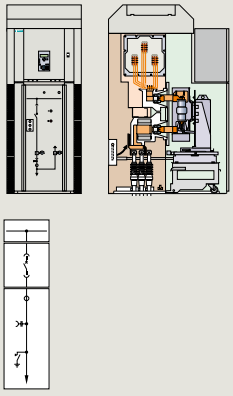
Circuit-breaker panel

NXAIR ≤ 24 kV



Circuit-breaker panel

NXAIR P



1) PI for switch-disconnector panel

NXAIR S

High-end technology in best form for the Chinese market

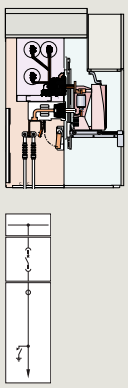
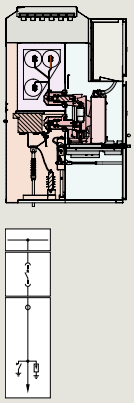
Technical features	NXAIR S	NXAIR S
Rated values up to	**12 kV, 40 kA, 4 s**	**24 kV, 31.5 kA, 4 s**
Busbar current up to	4000 A	3150 A
Feeder current up to	4000 A	3150 A
Busbars	Single busbar	
Insulation	Air-insulated	
Type of switchgear	According to GB 3906-2006, DL 404 Modular and extendable as individual panels	
Classification according to GB 3906-2006, DL 404		
Partition class	PM	
Loss of service continuity category	LSC 2B	
Accessibility to compartments	Busbar compartment:	Tool-based
	Switching-device compartment:	Interlock-controlled
	Cable compartment:	Interlock-controlled or tool-based
Internal arc classification	IAC A FLR 40 kA, 1 s	IAC A FLR 31.5 kA, 1 s
Dimensions		
Panel width	650 mm, 800 mm, 1000 mm	1000 mm
Panel height	2200 mm	2620 mm
Panel depth	1350 mm, 1500 mm	1810 mm

For further information, see catalog 1719-D909007-0213X for NXAIR S 12 kV, 1735-D909014-06131 for NXAIR S 24 kV

NXAIR S 12 kV

NXAIR S 24 kV

Product range (in excerpts)

Circuit-breaker panel	Circuit-breaker panel
NXAIR S ≤ 12 kV	NXAIR S ≤ 24 kV
	

8BT1, 8BT2

Compact design and simple construction

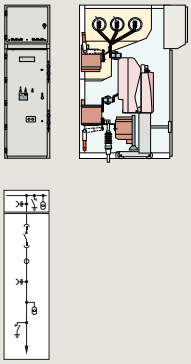
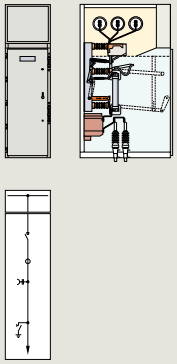
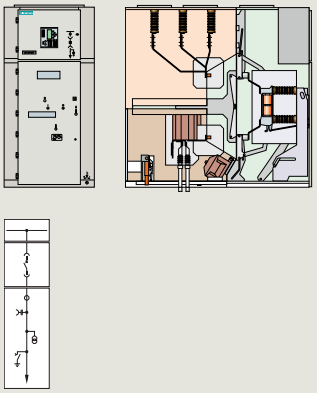
8BT1

8BT2

Technical features	8BT1	8BT2
Rated values up to	**24 kV, 25 kA, 3 s**	**36 kV, 31.5 kA, 3 s**
Busbar current up to	2000 A	3150 A
Feeder current up to	2000 A	3150 A
Busbars	Single busbar	
Insulation	Air-insulated	
Type of switchgear	Factory-assembled, type-tested, metal-enclosed switchgear according to IEC 62271-200 Modular and extendable as individual panels	
Classification according to IEC 62271-200		
Partition class	PM / PI[1)]	PM
Loss of service continuity category	LSC 2A	LSC 2B
Accessibility to compartments	Busbar compartment:	Tool-based
	Switching-device compartment:	Interlock-controlled
	Cable compartment from the front:	Interlock-controlled
Internal arc classification	IAC A FLR 25 kA, 1 s	IAC A FLR 31.5 kA, 1 s
Dimensions		
Panel width	600 mm, 800 mm, 1000 mm	1200 mm
Panel height	2300 mm	2750 mm (25 kA), 2800 mm (31.5 kA)
Panel depth	1410 mm	2450 mm (FL), 2700 mm (FLR)

For further information, see catalog 8BT1, HA 26.31, and catalog 8BT2, HA 26.41

Product range (in excerpts)

Circuit-breaker panel	Switch-disconnector panel	Circuit-breaker panel
8BT1		8BT2
		

1) PI for switch-disconnector panel

8BK80, 8BK88 PLUS

Designed for local applications

Technical features	8BK80	8BK80	8BK88 PLUS
Rated values up to	**12 kV, 44 kA, 3 s**	**36 kV, 31.5 kA, 3 s**	**12 kV, 26.3 kA, 3 s**
Busbar current up to	4000 A	3150 A	2000 A
Feeder current up to	3150 A	2500 A	1450 A
Busbars	Single busbar		
Insulation	Air-insulated		
Type of switchgear	Factory-assembled, type-tested, metal-enclosed switchgear according to IEC 62271-200 Modular and extendable as individual panels		
Classification according to IEC 62271-200			
Partition class	PM		
Loss of service continuity category	LSC 2B		
Accessibility to compartments	Busbar compartment:	Tool-based	
	Switching-device compartment:	Interlock-controlled	
	Cable compartment:	Tool-based	
Internal arc classification	IAC A FLR 40 kA, 1 s	IAC A FLR 31.5 kA, 0.1 s	IAC A FLR 26.3 kA, 1 s
Dimensions			
Panel width	700 mm, 800 mm, 1000 mm	1000 mm	600 mm
Panel height (each without low-voltage compartment)	1500 mm	1700 mm	1250 mm
Panel depth	1750 mm	2620 mm	1350 mm

For further information see catalog 8BK80 12kV, ICSG-20-001-001; catalog 8BK80 36kV, ICSG-20-001-002; catalog 8BK88 PLUS, ICSG-20-001-003

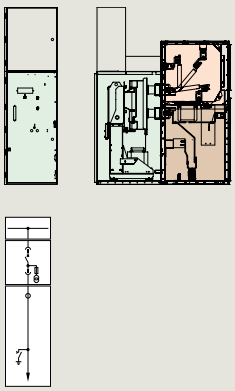
8BK80

8BK88 PLUS

Product range (in excerpts)

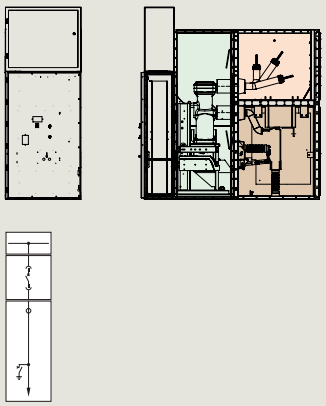
Circuit-breaker panel

8BK80 ≤ 12 kV



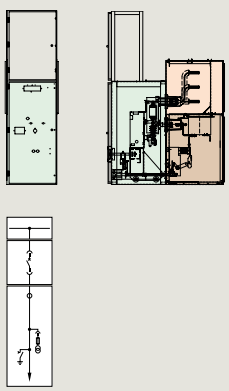
Circuit-breaker panel

8BK80 ≤ 36 kV



Circuit-breaker panel

8BK88 PLUS



GM-SG, GM-SG-AR, GM38

Flexibility is their strength

Technical features	GM-SG	GM-SG-AR	GM38
Rated values up to	**15 kV, 63 kA, 3 s**	**15 kV, 50 kA, 3 s**	**38 kV, 31.5 kA, 2 s**
Busbar current up to	4000 A	4000 A	3000 A
Feeder current up to	4000 A	4000 A	3000 A
Busbars	Single busbar		
Insulation	Air-insulated		
Type of switchgear	Factory-assembled, type-tested, metal-enclosed switchgear according to ANSI/IEEE C 37.20.7 Modular and extendable as individual panels		
Classification according to ANSI / IEEE C 37.20.7			
Internal arc classification	Not resistant to internal arcing	Resistant to internal arcing	Not resistant to internal arcing
Dimensions			
Panel width	914 mm (36.0“)	1016 mm (40.0“)	1219 mm (48.0“)
Panel height	2419 mm (95.3“)	2957 mm (116.4“)	2794 mm (110.0“)
Panel depth	2507 mm (98.7“)	2502 mm (98.5“)	3302 mm (130.0“)

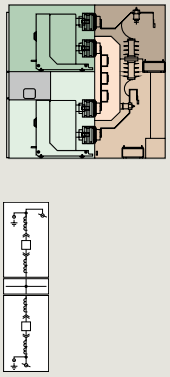
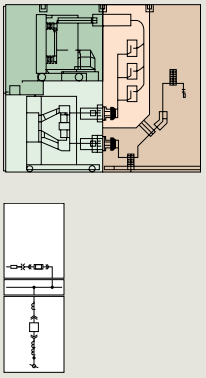
For further information, see catalog GM38, IC0001-F320-A131-X-4A00 and catalog GM-SG-/GM-SG-AR, IC1000-F320-A101-X-4A00

GM-SG

GM-SG-AR

GM38

Product range (in excerpts)

Circuit-breaker panel	Switch-disconnector panel
GM-SG	GM38
	

SIMOVAC-NAR, SIMOVAC-AR

Medium-voltage motor control center

Technical features	SIMOVAC-NAR	SIMOVAC-AR
Rated values up to	**7.2 kV, 63 kA, 2 s**	**7.2 kV, 63 kA, 2 s**
Busbar current up to	4000 A	4000 A
Feeder current up to	720 A	720 A
Busbars		
Insulation		
Type of switchgear	Factory-assembled, type-tested, metal-enclosed switchgear according to ANSI/IEEE C 37.20.7 Modular and extendable as individual panels	
Klassifizierung gemäß ANSI/IEEE C 37.20.7		
Internal arc classification	Not resistant to internal arc	Typ 2B
Dimensions		
Panel width	915 mm (36“)	914 mm (36“)
Panel height	2286 mm (90.0“)	2845 mm (112“)
Panel depth	762 mm (30.0“)	1029 mm (40.5“)

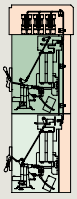
For further information, see catalog SIMOVAC, IC1000-F320-A144-V2-4A00

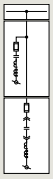
SIMOVAC-AR

Product range (in excerpts)

Disconnector panel

SIMOVAC





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