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SIEMENS

Ingenuity for life

Medium-Voltage Products and Services

From 5kV to 38kV

usa.siemens.com/assetservices

Product support for new and legacy equipment, retrofit solutions, and replacement circuit breakers for most OEM brands.

As the supplier of OEM parts for your Allis-Chalmers and Siemens medium-voltage switchgear and breakers, Siemens is committed to supporting you with qualified parts and factory trained field service support throughout your products' life cycle.

Siemens has a comprehensive database of drawings and manufacturing capabilities to fabricate a direct match. We design and manufacture all interfaces and extensions, including bus work and protection and control panels. Siemens' factory-trained field service technicians will work with you to install, connect, test, and commission the switchgear and match-in-line extension.

Medium-Voltage Vacuum Replacement Contactors

Medium-voltage vacuum replacement contactors provide a cost-effective way to upgrade your system capabilities to current vacuum technology while increasing equipment reliability and minimizing downtime. Siemens supports the Series 81000 controller product line and can provide replacement solutions for most 85H, 88H, 90H, 93H, 94H, 96H, 97H, and 98H contactor models.

Supporting

- New switchgear boasting the latest technology
- Medium-voltage motor controllers – 5kV to 15kV
- Add-on sections for legacy switchgear
- Replacement parts
- Replacement circuit breakers
- Replacement contactors
- Ground and test devices
- MV and LV circuit breakers to replace most brands
- Closed door racking solutions
- Training onsite or at our factory
- Service on medium- and low-voltage products
- Protection and control service and products

Support Capabilities

Outdoor Distribution Circuit Breakers

Brand/Type	Model	Operator	Current Availability				
			Spare Parts	Replacement Vacuum Breakers	Add-on Sections	Field Service	Training
Siemens (Vacuum)	SDV 7	3AH	✓	N/A	N/A	✓	✓
	SDV 6	3AH	✓	N/A	N/A	✓	✓
	SDV 5	3AH	✓	N/A	N/A	✓	✓
	SDV 4	GMI	✓	N/A	N/A	✓	✓
	SDV 3	GMI	✓	N/A	N/A	✓	✓
	SDV 2	3AF	✓	N/A	N/A	✓	✓
	SDV 1	3AF	✓	N/A	N/A	✓	✓

AIS (Air-Insulated) Switchgear

Brand/Type	Model	Operator	Current Availability					
			Spare Parts	Replacement Circuit Breakers	Add-on Sections	Closed Door Racking Solutions	Field Service	Training
Siemens (Vacuum)	GM-SG	3AH	✓	✓	✓	✓	✓	✓
	GM	GMI	✓	✓	✓	✓	✓	✓
	H2	3AF	✓	✓	✓	✓	✓	✓
	NXAIR	3AF	✓	✓	✓	✓	✓	✓
Allis-Chalmers (All Air-Magnetic)	MA	515-1		✓		✓	✓	✓
	MC/MCV			✓		✓	✓	✓
	FA	515-2	Limited	✓			✓	✓
	FB	515-2	Limited	✓			✓	✓
	FC	515-2	Limited	✓			✓	✓
(Oil)	VV1500	515-4v	Limited	✓			✓	✓
	IV Gear						✓	✓
	I Gear						✓	✓
	F Gear			✓		✓	✓	✓
	D Gear			✓			✓	✓
	R Gear						✓	✓
	ME Gear						✓	✓
	L Gear						✓	✓
	H Gear						✓	✓

GIS (Gas-Insulated) Switchgear

Brand/Type	Model	Operator	Current Availability			
			Spare Parts	Add-on Modules	Field Service	Training
Siemens (GIS)	8DA/B	8D	✓	✓	✓	✓
	8DAJH	8D	✓	✓	✓	✓

MVC (Medium-Voltage Control Centers)

Brand/Type	Model	Operator	Current Availability				
			Spare Parts	Replacement Vacuum Contactor	Add-on Sections	Field Service	Training
Siemens (Vacuum)	Simovac	3TL	✓	✓	✓	✓	✓
	Series 81000	97H	✓	✓*	Transition to Simovac	✓	✓
		98H	✓	✓*	Transition to Simovac	✓	✓
		88H	✓	✓*	Transition to Simovac	✓	✓
		85H	✓	✓*	Transition to Simovac	✓	✓
		90H	✓	✓*	Transition to Simovac	✓	✓
		93H	✓	✓*	Transition to Simovac	✓	✓
		94H	✓	✓*	Transition to Simovac	✓	✓
		96H	✓	✓*	Transition to Simovac	✓	✓

* Cell conversion kits are often needed to fit a new contactor into an old cell.

Siemens Technology

Protection and Control Upgrades

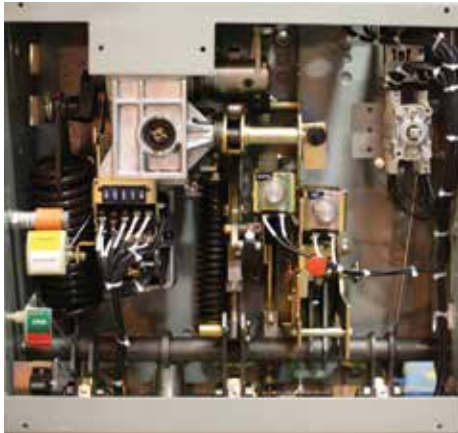
Many electric system operators need to modernize their protection and control systems in existing facilities. Siemens SIPROTEC® relays offer protection and control for transmission, generation, distribution, and industrial applications. Siemens can replace old relays with new SIPROTEC relays in the existing panels, or we can fabricate new panels. Siemens also provides the necessary engineering, documentation, relay settings, commissioning and aftermarket services to keep your equipment performing reliably and safely long after the equipment has been put in service.

OEM-certified Parts and Components

Siemens maintains a multi-million-dollar inventory for rapid supply of many key components. Siemens supports not only current production products, but also legacy medium-voltage and high-voltage products (Allis-Chalmers, Siemens-Allis, Westinghouse, Merlin Gerin high-voltage products, Trafo Union, VA Tech, Elin, EBG , ETG, Peebles, and Ferranti-Packard).

The 3AF/3AH mechanism comes equipped with a spring charge motor mechanism, which includes a lifetime lubricated gear box. Additionally, its superior construction includes roller bearings, bushings, and machined latches and cams.

3AF Operator



Used In	SDV1, SDV2, H2, NXAIR
Spare Parts	Are readily available
Maintenance Cycle	10,000 operations

3AH Operator



Used In	All Siemens MV Replacement Breakers, GMSG and SDV 5,6,7
Spare Parts	Are readily available
Maintenance Cycle	10,000 operations

The stored energy operating mechanism of the GMI circuit breaker is an integrated arrangement of springs, solenoids and mechanical devices designed to provide a number of critical functions. The energy necessary to close and open the contacts of the vacuum interrupters is stored in powerful tripping and closing springs. The closing springs are normally charged automatically, but there are provisions for manual charging. The operating mechanism that controls charging, closing, and tripping functions is fully trip-free, i.e., spring charging does not automatically change the position of the primary contacts, and the closing function may be overridden by the tripping function at any time.



GMI Operator



Used in	SDV 3, SDV4, GM
Spare Parts	Are readily available
Maintenance Cycle	5,000 operations

Vacuum Interrupters

Siemens vacuum interrupters are among the best in class in short-circuit breaking capacity. They offer:

- 30,000 circuit-breaker operation cycles
- 5 million operation cycles for contactors
- Maintenance-free service life
- Extremely high short-circuit breaking capacity
- High dielectric performance
- Very low chopping currents
- Minimal contact resistance

Our portfolio offers predictable and stable interruption over the entire product lifetime, even for extreme applications such as:

- Vibrating environments
- High and low frequencies
- Horizontal or vertical installation

In Siemens, you have a reliable and innovative partner with vast experience in vacuum switching technology:

- First patent in the 1930s
- More than 40 years of in-depth market experience
- In-house contact material production
- More than 5 million units installed in different applications throughout the world

Our vacuum interrupters are well established in all industries, including:

- Power utilities
- Steel mills
- Wind turbines
- Shipping
- Off-shore
- Railway

MV Roll-in Replacements

Roll-in replacement breakers provide a cost-effective way to upgrade to current vacuum technology while increasing equipment reliability and minimizing downtime. Siemens has designs for most major breaker models including:

Why Replacement Breakers?

- Increased reliability and performance
- Reduced operating and maintenance expenditures
- Reduced downtime, minimal changeover time during upgrade
- Preserved investment in existing cubicles
- Improved employee and environmental safety

Why Siemens?

- *Long operational life*
Siemens replacement breakers have an expected life of 30,000 mechanical operations and a maintenance interval of 10 years or 10,000 mechanical operations, which far exceeds most operational requirements in industrial and utility applications.



Siemens DHR (replacement for Westinghouse DH)



Siemens GER (replacement for GE Magne-Blast)

The following circuit breakers are available as pre-engineered designs. Other manufacturers, models, and ratings can be engineered by Siemens.

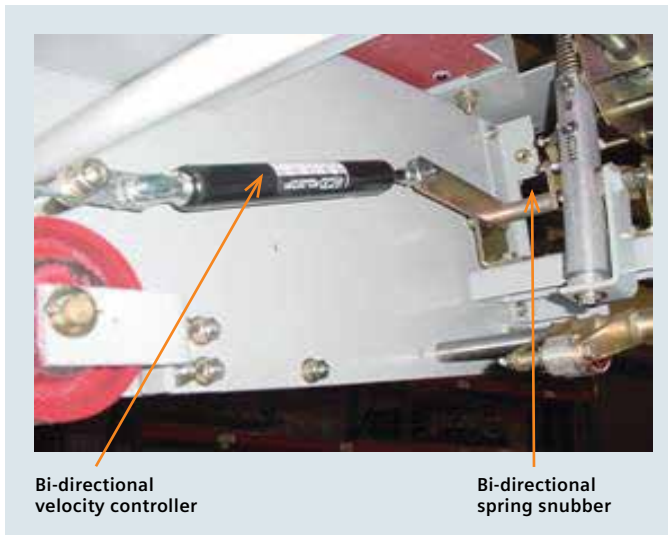
Manufacturer	Model	kV	Rating MVA	Amp				
Allis-Chalmers (All Air-Magnetic)	AM	4.76	150	1,200, 2,000				
			250	1,200, 2,000				
	MB/MBV	8.25	250	1,200, 2,000				
			500	1,200, 2,000				
	MC/MCV	15	150	1,200				
			250	1,200, 2,000				
				500	1,200, 2,000			
				1,000	1,200, 2,000, 3,000			
	MA	4.76	250	1,200, 2,000				
			350	1,200, 2,000				
	FA	4.76	350	3,000				
	FB	8.25	500	1,200, 2,000, 3,000				
	FC/FCV	15	500	1,200, 2,000				
			750	1,200, 2,000, 3,000				
				1,200, 2,000, 3,000				
Siemens	3AF (2-High)	4.76	250	1,200, 2,000				
			350	1,200, 2,000, 3,000				
				500	1,200, 2,000, 3,000			
				15	500	1,200, 2,000		
				750	1,200, 2,000			
				1,000	1,200, 2,000, 3,000			
GE (All Air-Magnetic)	Magne-Blast (AMH)	4.76	250	600, 1,200, 2,000				
	Magne-Blast (AM)	2.4	100	600, 1,200, 2,000				
			150	600, 1,200, 2,000				
			4.76	100	600, 1,200, 2,000			
				150	600, 1,200, 2,000			
				250	600, 1,200, 2,000			
				350	1,200, 2,000, 3,000			
			8.25	500	1,200, 2,000, 3,000			
			15	250	1,200, 2,000			
				500	1,200, 2,000			
				750	1,200, 2,000			
				1,000	1,200, 2,000, 3,000			
Westinghouse	DH	4.76	150	1,200, 2,000				
			250	1,200, 2,000				
			350	3,000				
			8.25	500	1,200, 2,000			
			15	500	1,200, 2,000			
				750	1,200, 2,000			
				1,000	1,200, 2,000, 3,000			
	DHP	4.76		250	1,200, 2,000			
				350	1,200, 2,000			
				8.25	500	1,200, 2,000, 2,500		
				15	500	1,200, 2,000		
							750, 750C	1,200, 2,000, 2,500
				1,000	1,200, 2,000, 2,500			
	ITE	HV	4.76	100	600, 1,200			
				150	600, 1,200			
250				600, 1,200				
HK		4.76		250	1,200, 2,000			
				8.25	500	1,200, 2,000		
				15	500	1,200, 2,000		
							750	1,200, 2,000
							1,000 (36" Cell)	1,200, 2,000
Federal Pacific	DST2	4.76	250 *	1,200, 2,000				
			8.25	500	1,200, 2,000			
			15	500	1,200, 2,000			
						750	1,200, 2,000	
	MOP	27	1,000	1,200				
McGraw Edison	PSD	15	501	1,200				
				502	2,000			
				751	1,200			

Technology Improvements

MOC Saver

Siemens patented MOC-Saver™ system addresses the various operational issues associated with replacing air-magnetic circuit breakers. The MOC-Saver system controls the velocity operating the original cubicle MOC system, thus mitigating the increased forces that would be applied to the cubicle MOC system.

The MOC-Saver provides positive MOC switch actuation in the Open and Close directions. The MOC-Saver includes a bi-directional stored energy mechanism (snubber) and a bi-directional hydraulic velocity controller. Operation of the legacy MOC switches requires sufficient energy from the vacuum circuit breaker stored energy mechanism to reliably close the circuit breaker while not damaging the MOC system yet maintaining full interchangeability.



MOC Saver

52STA Actuator

The 52STA actuator originally supplied with the legacy GE Magna-Blast switchgear was designed to absorb the output forces generated by the legacy circuit breakers stored energy mechanism and protect the MOC switches. Unfortunately, after years of use, the original 52STA actuator may develop a tendency to bind and not reset the MOC switches as required. This binding, along with the significant force that is generated in the stored energy mechanism of modern circuit breakers can be a problem for equipment owners. Fortunately, Siemens has developed replacement 52STA actuator mechanisms to prevent potential problems associated with these known issues and incorporated it in their replacement circuit breakers for legacy GE Magne-Blast switchgear in the US market.



52STA Actuator

Universal SARRACS Racking Device

Switchgear Type	Integrated Motorized Racking	Closed Door Modification	Universal Racking Device	Remote SCADA Control
GM-SG	✓	✓	✓	✓
GM/GMI		✓	✓	
Allis-Chalmers D, F		✓	✓	

The universal racking device can be used with most medium- and low-voltage switchgear made by Siemens and other OEMs.

Unmatched control capabilities

The advanced Siemens PLC provides the control required to limit damage to the breaker or cell that can be caused by equipment misalignment and jamming. This allows for:

- Accurate detection of breaker positions requiring high or low torque
- Precise position tracking and movement monitoring to .001 in.

Total flexibility – one unit can take on any breaker

- The breaker memory can be easily updated anytime a breaker is being racked.
- Simply adjust the elevation of the motor carriage to align the gear motor assembly to the racking mechanism on any manufacturer’s breaker

Get your operators up to speed in the shortest possible time, either at your facility or at one of our training centers, Siemens can provide professional training to ensure safe and efficient SARRACS operation.

Maximize Safety

Using the touch screen on the portable operator station, the racking procedures can be controlled from a distance of up to 75 ft.

Streamlining the Process Improves Racking Efficiency and Reduces Downtime

SARRACS shortens breaker racking times by as much as 50% over traditional techniques. In addition, it allows expenses for related safety equipment, including flash suits, to be kept to a minimum.

SARRACS uses a three-phase gear motor to provide the power needed for racking, and a digital encoder for precise position control and sensing. An AC variable-frequency drive operates all speed adjustments, over current limits, and ramp functions.



Universal Racking

Closed Door Modification Racking

In order to improve operator safety, Siemens offers a field modification to convert Siemens switchgear to a closed-door, remote rack design. This modification provides a cost-effective solution to keep operators clear of the arc flash zone during breaker racking.

Allis-Chalmers and, later, Siemens manufactured types D and F medium-voltage switchgear from 1958 through the late 1980s. This gear utilized air-magnetic breakers that were typically manually racked via a lever while the cubicle panel door was open.

The field modification consists of a floor-mounted screw racking device, and a breaker-mounted bracket to interface with the floor-mounted screw device. These additions allow end-users to have either closed-door manual racking or closed-door remote racking.

The closed-door remote racking option requires the above-mentioned cell and breaker additions, as well as a minor front panel modification, to accept a torque-regulated motor. The motor can be moved from one cell position to the next; thus, only one motor device is required.



GM-SG Integrated Electrical Racking

Siemens Integrated Electric-Racking System (SIERS) provides additional personnel protection against arc-flash exposure for operators by providing a means of remotely racking the drawout circuit breaker for Siemens types GM-SG non-arc-resistant 5kV-15kV, GM-SG-AR arc-resistant 5kV-15kV and GM38 non-arc-resistant 38 kV switchgear.

SIERS delivers a safe, easy-to-use, cost-effective, reliable, and flexible way to remotely rack a drawout circuit breaker while standing outside of the arc-flash zone. This reduces the need for personal protective equipment (PPE) per the NFPA-70E® standard.



Top view of racking screw

SIERS Type	Description
Basic	Each circuit breaker cell is equipped with an integrated, electric-racking system, which includes a fixed-mounted, high torque motor and logic control module, control-pendant connector powered by control power in the switchgear or an external supply (either 120 Vac or 125 Vdc) when necessary. Typically, one control pendant is supplied per lineup. Type SIERS integrated, electric-racking system – one per circuit breaker cell Control pendant – one per lineup.
Local HMI	Basic type plus local HMI panel PC interface with GM-SG, GM-SG-AR, or GM38 lineup(s) in the electrical room
Remote SCADA	Basic type plus custom interface with SCADA or other system

The universal racking device can be used with most medium- and low-voltage switchgear made by Siemens and other OEMs.

Low-Voltage Retrofit Circuit Breakers

The following circuit breakers are available as pre-engineered designs. Other manufacturers models and ratings can be engineered by Siemens by customer request.

Manufacturer	Model
Siemens	RL, SB, LA2
ABB/ITE	K-Line
Westinghouse	DB, DS
GE	AK

Meets UL 489, UL 1066, ANSI C37.13

Reliable

This highly engineered reliable design offers increased operations and the Extended Instantaneous Protection (pat. pending) function allowing 100% of the full withstand rating of the frame and still providing the ability of the breaker to be applied up to the maximum Interrupting Rating. Mechanical/Electrical duty cycles of up to 15,000 operations with maintenance. Highly accurate internal Rogowski CTs allow for precision protection and metering – saving money on down time, field service, and increased customer satisfaction.

Safe

Safety-related features such as a visible, ready-to-close indicator, customizable interlocking, and mechanical trip indication offer peace-of-mind. Available Siemens Dynamic Arc Sentry (DAS) provides an arc flash mitigation mode that reduces trip unit parameters to lower the possible arc flash energy.

Easy to Use

The ease of use—from integrated racking handles, pull-apart front-mounted terminal blocks, and simple selection and application tools—reduces installation time and errors, adds flexibility, and minimizes training.

Speed of Delivery

Located in the United States, our production facility is positioned to deliver your retrofit breakers within your required timeframe needed.



KLH 1600

Modular & Flexible

The modularity and flexibility of front-mounted common plug-in accessories, field upgradable trip units, and field changeable contacts and arc chutes reduce inventory, allow for last-minute adaptations, support quick-ship opportunities, forgive changes, and support the most cost-effective configuration. Electronic or solid state trip units are available, depending on your needs and application.

Electronic trip units (ETUs)

Power system protection is necessary to treat common types of abnormal occurrences, such as overloads or faults that can lead to electrical power system failure. The methods for detecting and clearing such abnormalities and restoring to normal operation is an engineered technique. Adequate protection requires constant measurements of certain system quantities, such as voltages and currents, comparing those system quantities, or some combination of the quantities, to a threshold setting computed by a systems engineer and set into an electronic trip unit like those available on the WL breakers. It's equally important for power system protection to perform under normal operating conditions. If the above thresholds are set too low the power may be interrupted unnecessarily causing loss of productivity or safety provisions. The WL circuit breaker offers a practical means of setting power system protection through vast selectivity available in its Electronic Trip Unit (ETU). WL ETUs have a wide range of protective settings for implementing simple or complex coordination schemes and configuring reliable system protection.

Solid State Trip Units

Siemens utilizes solid state trip units for circuit breakers requiring a safety qualification for use in harsh environments. These ruggedly constructed trip units are universally compatible with all Siemens Low-Voltage retrofit breakers designed for use in harsh environments. They have a function selector switch that allows the user to select between LSI, LI and LS trip functions making them versatile for use in coordination schemes. Pickup and time delays are set using rugged selection dials. Ground fault protection and an arc flash mitigating maintenance mode are available. A communications interface option is available that provides dry contacts for a number of outputs (Short Circuit, Overload, Ground Fault, etc.) and inputs (Remote Reset, Arc Flash Mode, etc.).

Low-voltage retrofit solutions featuring the Siemens WL operator:

- Utilizing feature-rich electronic trip units
- Solid State trip units are available for Nuclear 1E applications
- Designed and built in the USA.



KLW 1600

Electronic Trip Units

Features and Characteristics	Solid State Trip Unit	ETUs
Long-time overcurrent protection (L)	✓	
Short-time delayed overcurrent protection (S)	✓	
Instantaneous overcurrent protection (I)	✓	
Neutral conductor protection (N)		
Ground fault protection	0	
Selectable neutral protection		
Defeatable short-time protection	✓	
Defeatable instantaneous protection	✓	
Selectable thermal memory		
Zone selective interlocking		
Selectable I2t or fixed short-time delay		
Adjustable instantaneous pickup	✓	
Selectable I2t or I4t long-time delay		
Selectable and adjustable neutral protection		
Dual protective setting capability		
Dynamic arc-flash Sentry (DAS) or Arc Flash Mode	0	varies
Extended instantaneous protection (EIP)		
Parameterization by rotary switches	✓	
Parameterization by communication (absolute values)		
Parameterization by menu/keypad (absolute values)		
Remote parameterization of the alarm functions		
Remote parameterization of the relay functions		
Alpha-numeric display		
Graphical display		
Power metering function		
Communication via PROFIBUS-DP		
Communication via MODBUS		
Communication via Ethernet (BDA)		
Communication via dry contacts	0	
Rated for harsh environment applications	✓	

(✓) = standard feature, (0) = optional