SIEMENS

3AE8 12kV 50kA
Vacuum Circuit Breaker

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Overview

High-quality 3AE-SION Vacuum Circuit Breaker

Thanks to 40-year vacuum product design and operation experiences, 3AE-SION series is the latest generation of circuit breaker developed and manufactured by Siemens for electric power market, featuring advanced technologies from Germany and leading the future of vacuum circuit breakers, which can be widely used in power distribution fields, such as power grid, power plant, metallurgy, petrochemical and urban infrastructure.

- Universal interface size, compatible with KYN28 series.
- Optional pole-center distance and width across flats for various special needs.
- 12/24kV:Compliant with the requirements of Classes E2, M2 and C2
- Rated short-circuit breaking capacity: 50 operations.
- Maintenance-free within 10,000 operations under normal conditions.
- Improved insulation strength due to innovative insulation design and new materials, and more suitable for technical standards and all-insulation operation requirements of power system.circuit breakers thanks to long creepage distance insulation design and the newly developed vacuum interrupter with long creepage distance.
- Perfect and fast technical supports and flexible solutions are provided.

With Siemens' more than 40 years of vacuum switch production experiences, 3AE8 pole type vacuum circuit breakers aim to serve the high-end market and meet the market's requirements for poles, featuring high mechanical life, large breaking current, low contact wear, low cut-off current, maintenance-free operation and high economic advantages.

Vacuum interrupter

With reasonable structural design, high quality raw materials and advanced parts processing technology, Siemens vacuum interrupters ensure higher insulating strength of the interrupter.

- Strong breaking capability of short-circuit current
- Lower contact resistance
- Good vacuum leakproofness
- Lower average chopping current
- Less contact burning loss
- High insulating strength

Fully embedded pole

With embedding technology, the vacuum interrupter, primary circuit and insulating tension pole are fully embedded in an epoxy resin pole, so primary conductive circuit is isolated completely from the outside.

Modular operating mechanism

Advanced processing technology guarantees high resistance of the operating mechanism to pollution and corrosion, simple and reliable operation, minimal maintenance in the life cycle.

Overview

Operating Environment

1. Ambient air temperature: -25° C to +40° C;
2. Relative humidity: up to 95% (daily average) or 90% (monthly average);
3. Installation altitude: up to 1000m (for high altitude requirement, please contact with Siemens);
4. Seismic intensity up to 8° ;
5. No fire and explosion hazard, serious pollution, chemical corrosion and severe vibration.

When operational environment exceeds the above scope, please consult with Siemens to determine the allowable range and technical measures.

Technical Parameters

3AE-SION vacuum circuit breakers comply with GB1984 and IEC 62271-100 and other relevant standards of main industrialized countries.

Rated voltage		kV	12
Rated frequency		Hz	50
Rated insulation level	**Rated 1min power-frequency withstand voltage phase-to-earth and between phases/ between open contacts**	kV	42/48
	Lightning impulse withstand voltage (peak) phase-to-earth and between phases/ between open contacts		75/85
Rated current		A	1250/1600/2000/ 2500/3150/4000*[1]/5000*[1]
DC Component			50%
Rated short-circuit breaking current		kA	50
Rated short-time withstand current		kA	50
Rated short-circuit duration		s	4
Rated short-circuit making current (peak)		kA	130
Rated peak withstand current		kA	130
Power frequency withstand voltage of secondary circuit (1 Min)		V	2000
Opening time		ms	≤ 30
Closing time		ms	≤ 60
Arcing time		ms	≤ 15
Contact bounce duration at closing operation		ms	≤ 2
Closing/opening non-synchronism		ms	≤ 2
Mechanical life		cycles	10000*[2]
Breaking cycles at rated short-circuit breaking current		cycles	50/E2
Rated closing operating voltage		V	AC 110 V/220 V, DC 110 V/220 V
Rated opening operating voltage		V	AC 110 V/220 V, DC 110 V/220 V
Spring charge time		s	≤ 15
Rated operation sequence			OFF- 0.3s-ON/OFF-180s -ON/OFF

*[1)] Forced air cooling for OEM switchgear.

*[2)] For 30,000 operations, please contact Siemens.

Scope of Supply of 3AE-SION (3AE8, 12kV)

Scope of Supply

3AE-SION (3AE8)

Fixed type

MLFB (First 8)	Pole-center distance (mm)	Width across flats (mm)	Lower pole to circuit breaker (mm)	Rated voltage (kV)	Rated short-circuit making current (kA)	Rated short-circuit breaking current (kA)	Duration of rated short circuit (s)	Rated current (A)	Rated power-frequency withstand voltage (kV)	Rated lighting impulse withstand voltage (kV)
3AE8187-2	210	310	237.5	12	130	50	4	1250	42	75
3AE8197-2	210	310	252.5							
3AE8587-2	275	310	237.5							
3AE8597-2	275	310	252.5							
3AE8187-3	210	310	237.5	12	130	50	4	1600	42	75
3AE8197-3	210	310	252.5							
3AE8587-3	275	310	237.5							
3AE8597-3	275	310	252.5							
3AE8587-4	275	310	237.5	12	130	50	4	2000	42	75
3AE8597-4	275	310	252.5							
3AE8587-6	275	310	237.5	12	130	50	4	2500	42	75
3AE8597-6	275	310	252.5							
3AE8587-7	275	310	237.5	12	130	50	4	3150	42	75
3AE8597-7	275	310	252.5							
3AE8587-8	275	310	273.5	12	130	50	4	4000[1)]	42	75
3AE8597-8	275	310	252.5							

1) Forced air cooling for OEM switchgear

Scope of Supply

3AE-SION (3AE8)

Withdrawable type

MLFB (First 8)	Pole-center distance (mm)	Width across flats (mm)	Lower pole to circuit breaker (mm)	Rated voltage (kV)	Rated short-circuit making current (kA)	Rated short-circuit breaking current (kA)	Duration of rated short circuit (s)	Rated current (A)	Rated power-frequency withstand voltage (kV)	Rated lighting impulse withstand voltage (kV)
3AE8187-2	210	310	280	12	130	50	4	1250	42	75
3AE8197-2	210	310	295							
3AE8587-2	275	310	280							
3AE8597-2	275	310	295							
3AE8187-3	210	310	280	12	130	50	4	1600	42	75
3AE8197-3	210	310	295							
3AE8587-3	275	310	280							
3AE8597-3	275	310	295							
3AE8587-4	275	310	280	12	130	50	4	2000	42	75
3AE8597-4	275	310	295							
3AE8587-6	275	310	280	12	130	50	4	2500	42	75
3AE8597-6	275	310	295							
3AE8587-7	275	310	280	12	130	50	4	3150	42	75
3AE8597-7	275	310	295							
3AE8587-8	275	310	280	12	130	50	4	4000[1)]	42	75
3AE8597-8	275	310	295							
3AE8587-9 (H3B)	275	310	280	12	130	50	4	5000[1)]	42	75

1) Forced air cooling for OEM switchgear

Design and Dimension Drawings of 3AE-SION (3AE8, 12kV)

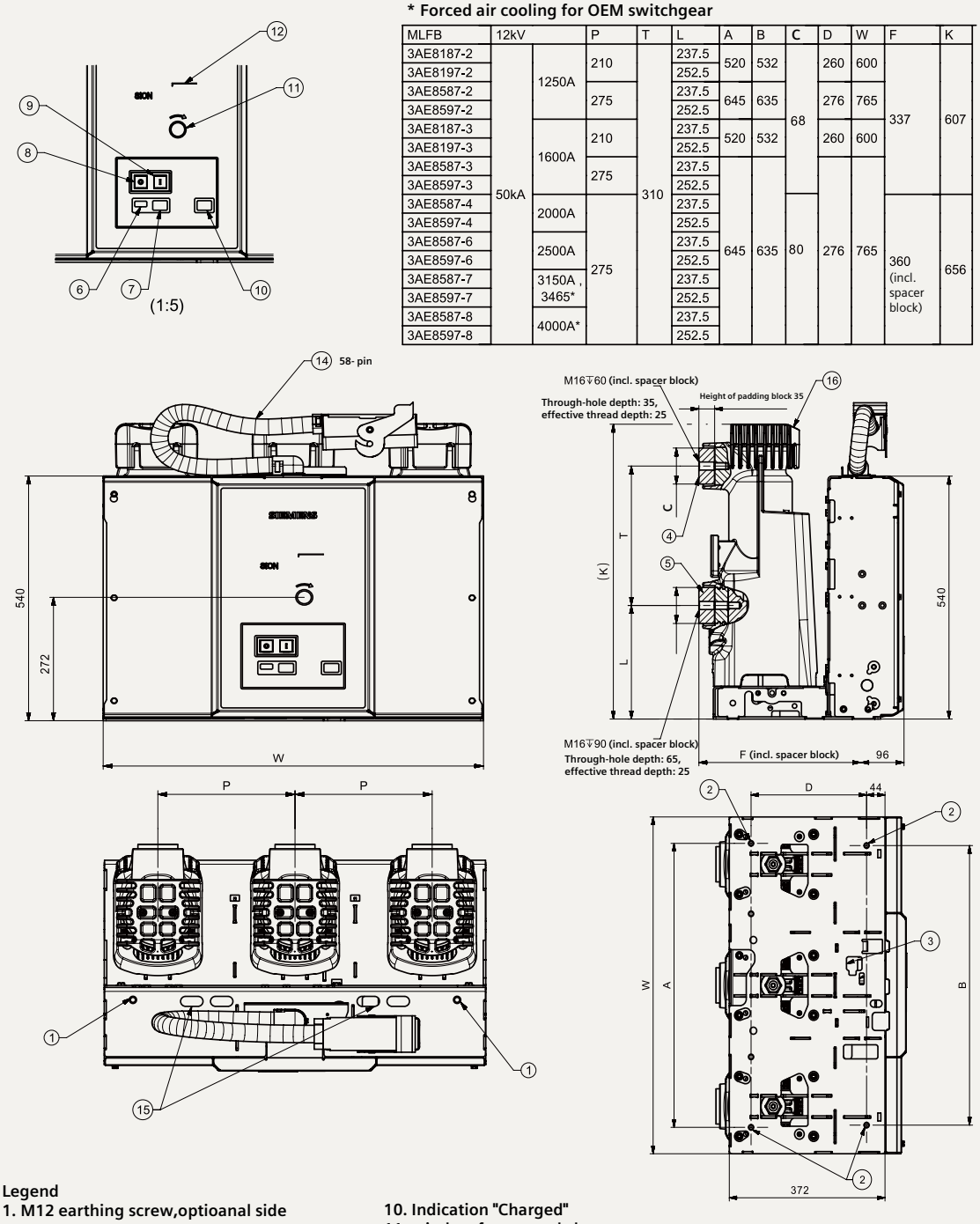
Design and Dimension Drawings

3AE-SION (EP12)

Fixed type

*** Forced air cooling for OEM switchgear**

MLFB	12kV		P	T	L	A	B	C	D	W	F	K
3AE8187-2	50kA	1250A	210	310	237.5	520	532	68	260	600	337	607
3AE8197-2					252.5							
3AE8587-2			275		237.5	645	635		276	765		
3AE8597-2					252.5							
3AE8187-3		1600A	210		237.5	520	532		260	600		
3AE8197-3					252.5							
3AE8587-3			275		237.5	645	635	80	276	765	360 (incl. spacer block)	656
3AE8597-3					252.5							
3AE8587-4		2000A	275		237.5							
3AE8597-4					252.5							
3AE8587-6		2500A			237.5							
3AE8597-6					252.5							
3AE8587-7		3150A , 3465*			237.5							
3AE8597-7					252.5							
3AE8587-8		4000A*			237.5							
3AE8597-8					252.5							



Legend

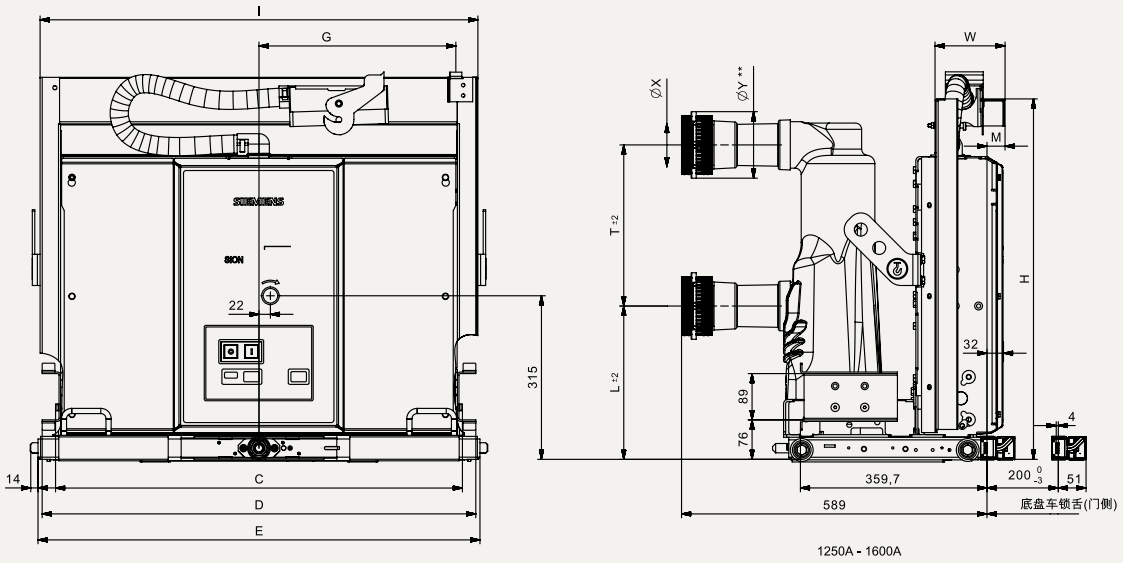
1. M12 earthing screw,optioanal side
2. Breaker instalation with M10
3. Window for mechanical interlocking 32x32
4. Upper terminal areas
5. Lower terminal areas
6. Operation cycle counter
7. Position indication device
8. Indication "OFF"
9. Indication "ON"
10. Indication "Charged"
11. window for manual charge
12. Rating plate
13. manual charge handle
14. Secondary Plug (58-/64-pin)
15. lifting hook
16. Heat-sink, only for current >3150A

*** Forced air cooling for OEM switchgear**

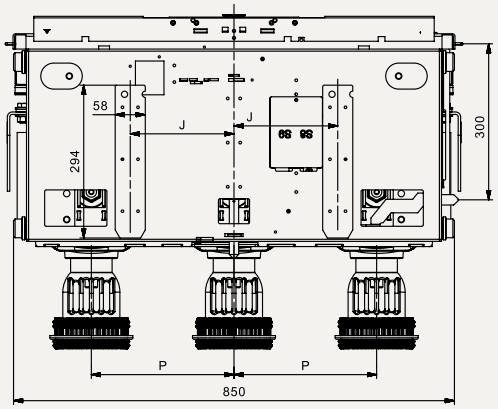
Design and Dimension Drawings

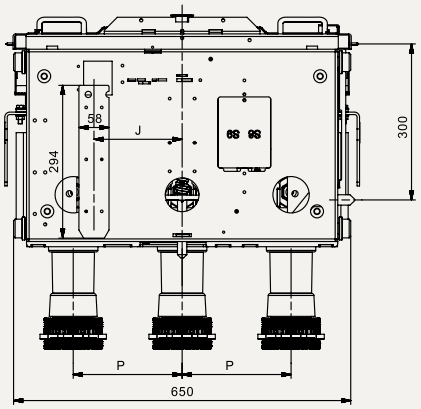
3AE-SION (EP12)

Withdrawable type

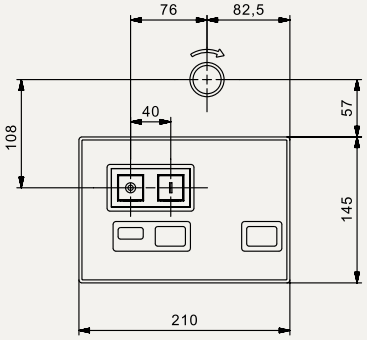


1250A - 1600A





*OEM开关柜强迫风冷



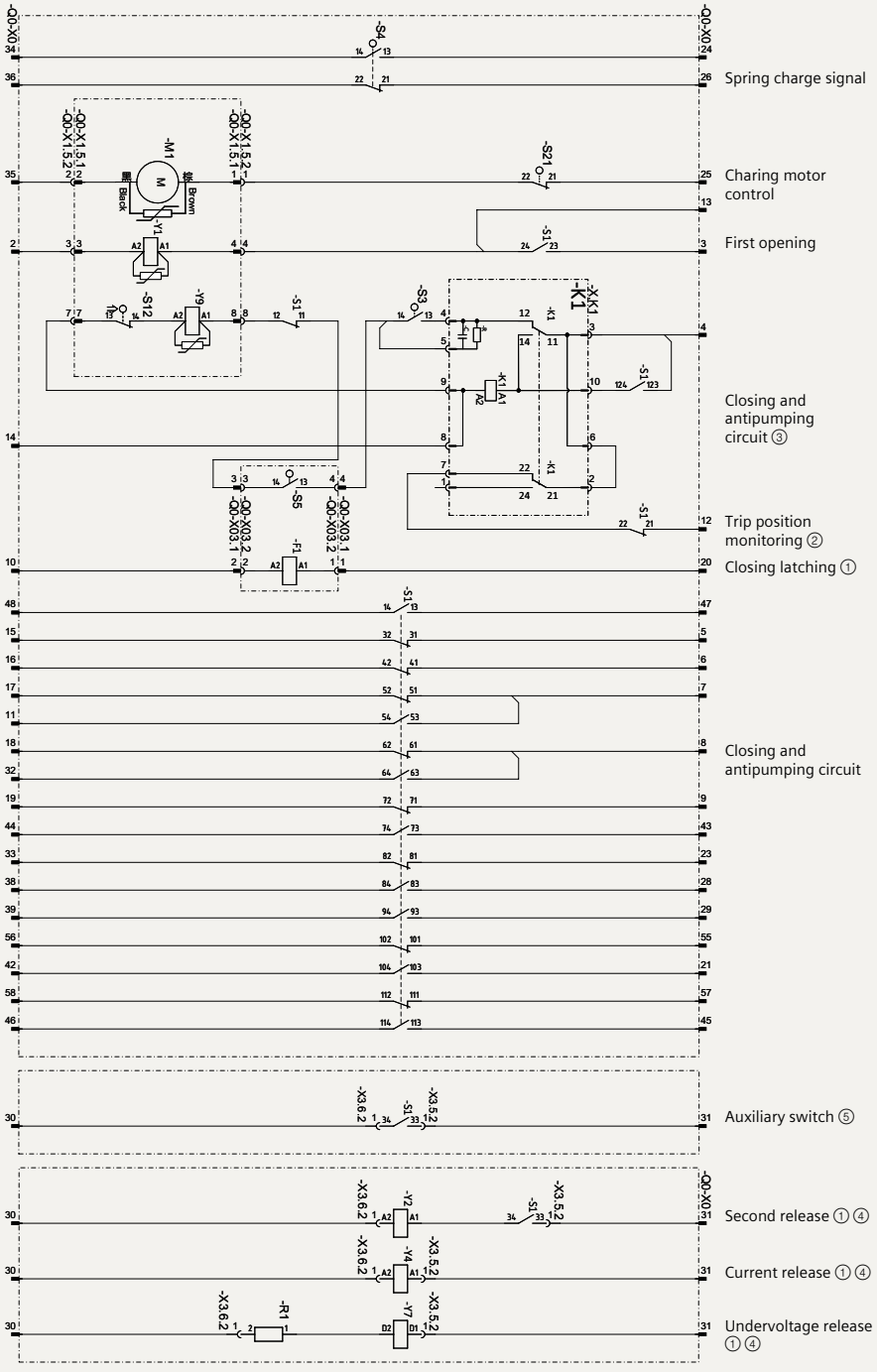
断路器面板区域

MLFB	12kV		P	T	L	C	D	E	G	H	I	J	K	M	V	W	X	Y
3AE8187-2	50kA	1250A **	210	310	280	606	640	652	279	694	644	170	-	35	650	135	79	128
3AE8197-2					295													
3AE8587-2			275		280	784	836	852	379		844	200		20	850	102		
3AE8597-2					295													
3AE8187-3		1600A	210		280	606	640	652	279		644	170		35	650	135		
3AE8197-3					295													
3AE8587-3			275		280	784	836	852	379	735	844	200	685	20	850	102	109	160
3AE8597-3					295								700					
3AE8587-4		2000A			280								685					
3AE8597-4					295								700					
3AE8587-6		2500A			280								685					
3AE8597-6					295								700					
3AE8587-7		3150A / 3465A*			280								685					
3AE8597-7					295								700					
3AE8587-8		4000A*			280								685					
3AE8597-8					295								700					
3AE8587-9		5000A*			280							–						

Secondary Wiring Diagram

Fixed type

Designation	
M1	Charging motor
Y1，Y9	Opening coil, closing coil
K1	Anti-pumping relay module
S1	Auxiliary switch
S3，S4，S5，S12，S21	Position switch
F1	Closing latching solenoid
X1.5.1，X1.5.2，X.K1	10-pin terminal
X0，X03.1，X03.2	58-. 4-, 4-pin terminal
Q0	Circuit breaker
Y2，Y4，Y7，R1	Second release, current release, undervoltage release, resistor
X3.5.2，X3.6.2	Terminals – push-in



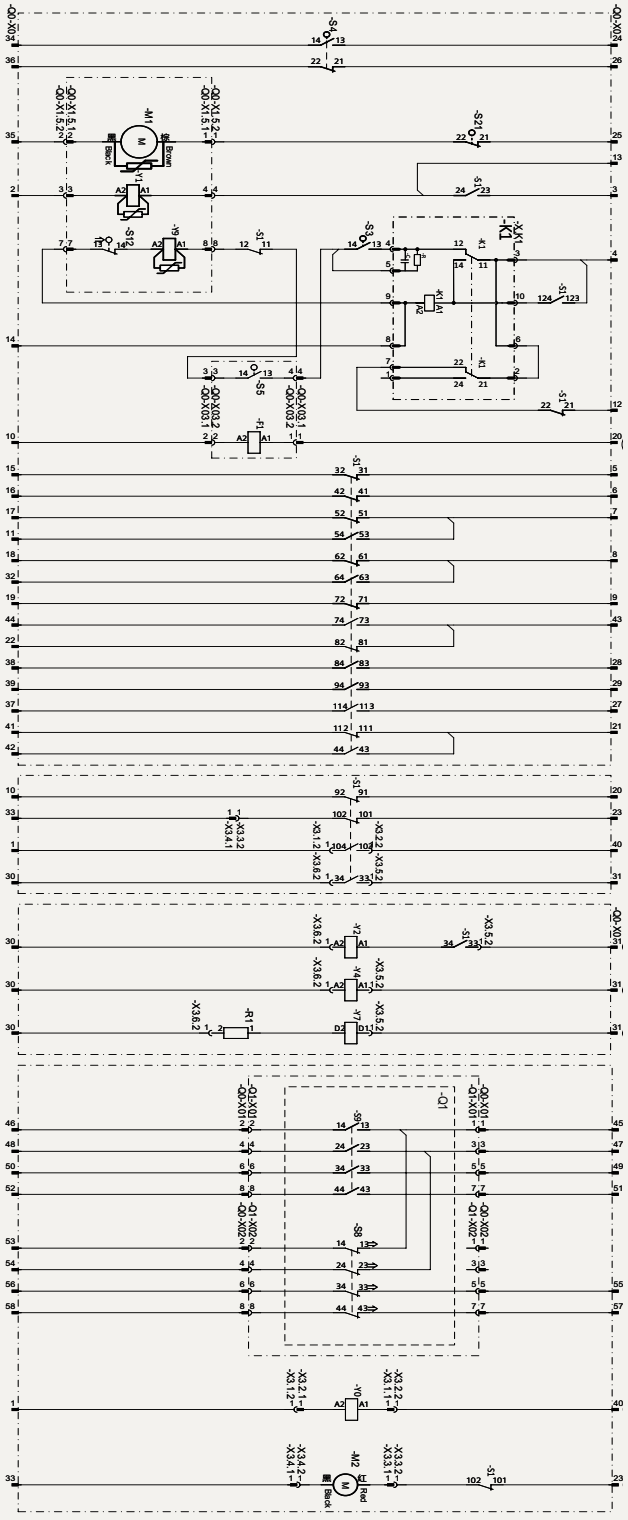
Notes:

1) The circuit breaker is in the OFF and Not Charged status.
2) Optional for parts marked with ①. If necessary, please specify individual requirements in the order.
3) Only one of the second release, undervoltage release and current release can be configured.
4) Part marked with ② is the anti-pumping position monitoring circuit. If necessary, the trip position relay of the protection relay device can be connected at -X0:12.
5) Part marked with ③ is the anti-pumping function wiring. If the anti-pumping function is not required, -S1:123/124 do not need to be wired.
6) -S12 is the mechanical interlock position switch to prevent electrical closing.
7) NO contacts of ④ additional release and ⑤ auxiliary switch can not be selected simultaneously. NO contacts of ⑤ auxiliary switch are selected by default.

The secondary diagram in the brochure is only for reference, and the actual order drawings shall prevail.

Withdrawable type

Designation	
M1，M2	Charging motor, chassis motor
Y1，Y9	Opening coil, closing coil
K1	Anti-pumping relay module
S8，S9	Truck position switch
S1	Auxiliary switch
S3，S4，S5，S12，S21	Position switch
F1，Y0	Closing latching solenoid, truck latching solenoid
X1.5.1，X1.5.2，X01，X02，X.K1	10-pin terminal
X0，X03.1，X03.2	58-. 4-, 4-pin terminal
Q0，Q1	Circuit breaker, chassis
Y2，Y4，Y7，R1	Second release, current release, undervoltage release, resistor
X.1/2/3/4.1，X.1/2/3/5/6.2	Terminals – plug-in, Terminals – push-in



Notes:

1) The circuit breaker is in TEST, OFF or NOT CHARGED position.
2) Parts marked with ① are optional. If required, please specify in the order.
3) Only one of the following can be configured: secondary release, undervoltage release, or current release.
4) Parts marked with ② indicates the trip position monitoring circuit. If required, the trip position relay of the protective relay can be connected at -X0:12.
5) Parts marked with ③ indicates the anti-trip function wiring. If the anti-trip function is not required, no wiring is needed for -S1:123/124.
6) -S12 is the signal switch for the circuit breaker TEST/SERVICE position.
7) The additional release ④ and auxiliary switch NO contact ⑨ can only be selected one at a time. By default, ⑨ is selected.
8) The cassette motor ⑤ (electric cassette) and auxiliary switch NC contact ⑦ can only be selected one at a time. By default, ⑦ is selected.
9) The cassette latching electromagnet Y0 ⑥ and auxiliary switch NO contact ⑧ can only be selected one at a time. By default, ⑧ is selected.
10) The closing latching electromagnet F1 ⑪ and auxiliary switch NC contact ⑩ can only be selected one at a time. By default, ⑩ is selected.
11) ⑫ is only used for 12kV / 24kV cassettes.

The secondary diagram in the brochure is only for reference, and the actual order drawings shall prevail.

Detailed Description of Circuit Breaker Configuration

Configuration Table

Basic Configuration	Motor-driven operating mechanism (M1)	*
	Closing coil (Y9)	*
	Opening coil (Y1)	*
	Closing spring charging signal switch (S41, S42)	*
	Closing spring position signal switch (S21, S22)	*
	Closing spring position signal switch (S3)	*
	Operating counter	*
	Mechanical interlocking	*
	Terminals for secondary wiring (58-pin plug and socket)	*
	Auxiliary switch 12 NO+12 NC	*

*: available
For any special requirements, please specify in the order.

Mechanical Parameters

Motor-driven (M1) operating mechanism with energy storage mechanism (with varistor module *)
Energy storage mechanism of circuit breaker can be driven by motor, including closing coil to replace manual operating mechanism. In case of power ON and the energy of closing spring released, motor will start energy storage automatically, and power will be OFF upon the completion of energy storage.
The motor is in overload status during part of spring energy storage period.

To protect the motor, we recommend low-voltage switch with C characteristics. Operating voltage can vary between -15% and +10% of rated voltage.
Manual energy storage is also available for circuit breaker, and the handle is used for closing spring energy storage of circuit breaker until “Spring Charged” appears, and a clear sound heard means the closing pawl has been locked. The circuit breaker now can be closed manually or electrically. After closing, restart manual energy storage for closing spring.

Opening/Closing Coil

Closing coil (Y9) (with varistor module *)
Closing coil is energized to make the closing spring release energy, i.e. electrical closing. AC/DC operation can be selected. Operating voltage can vary between -15% and +10% of rated voltage.
Power consumption: 300 to 370 W according to different voltage levels; 550W for DC24V

Opening coil (Y1) (with varistor module *)
Opening coil is the basic component of circuit breaker, which can “open” locking mechanism with iron core of the coil to open circuit breaker directly. Operating voltage can vary between -35% and +10% (DC) or -15% and +10% (AC) of rated voltage.
Power consumption: 300 to 370 W according to different voltage levels; 550W for DC24V

Second opening coil (Y2) (optional)
If several opening coilsare required, 3AY1410 second opening coil shall be provided. In this case, the tripping pulse is transmitted from the direct-acting armature to the OFF latch, thereby turning the vacuum circuit breaker OFF.
Power consumption: 300 to 370 W according to different voltage levels.

Detailed Description of Circuit Breaker Configuration

Overcurrent release (Y4) 3AX1102 (optional)

Overcurrent release is composed of a set of energy storage mechanism, unlocking mechanism and electromagnetic system. When the tripping current exceeds 90% of rated tripping current of the release, unlocking device of energy storage mechanism will be released, and circuit breaker is OFF. Except for current transformer, such release must be provided with a coupling transformer.

When tripping current is 90% of rated tripping current, and the release is provided with opening iron core, the power consumed is about 10VA.

Undervoltage release (Y7) 3AX1103 (optional)

Undervoltage release is composed of a set of energy storage mechanism, unlocking mechanism and electromagnetic system. When circuit breaker is in Closed status, the electromagnetic system is connected to power supply. When power voltage drops to a certain value, unlocking mechanism will release, and circuit breaker is opened by spring energy storage mechanism. Undervoltage release can also be installed on the current transformer. When the operating voltage drops below 35% or the control voltage is directly lost, the circuit breaker will be automatically opened.

Power consumption: about 20W.

Auxiliary switch (S1)

12 NO + 12 NC auxiliary switch is provided.

Insulation Class : Class C (DIN VDE 0110)

Rated making current: 50A

Load current: 10A

Breaking capacity: refer to the table below.

Voltage	Breaking Capacity [A]	
	Resistive load	Inductive load
up to AC 230V	10	10
DC 110 V	5	4
DC 220 V	2.5	2

Mechanical/electrical interlocking

Energy storage mechanism of 3AE circuit breaker can be provided with a mechanical/electrical interlocking device to interlock the circuit breaker truck at a certain position.

The user must use a sensor component which can judge the ON/OFF status of circuit breaker. When circuit breaker is in OFF status, circuit breaker can be closed mechanically or electrically.

The sensor component shall be designed to ensure that the disconnecter switch, the removable part of the circuit breaker or the truck can not be operated when the circuit breaker is in ON status. For details of sensor component, please refer to user manual.

Secondary wiring

The control leads ares connected to each electrical unit directly, and led to plugs/sockets.

For the adjustment of secondary wiring, it is recommended to refer to secondary wiring diagram supplied with circuit breaker. (For details, please contact Siemens).

Closing latching solenoid (F1) (12kV/24kV optional)

Operating mechanism can be closed only when the closing latching solenoid is energized and remained.

Truck latching solenoid (Y0) (optional)

The truck can be rack in /out only when the truck latching solenoid is energized and remained.

Published by
Siemens Ltd., China

Smart Infrastructure
Electrification & Automation

No. 7 Wangjing Zhonghan Nanlu
Chaoyang District,
Beijing, China.

Article No.
Produced in China

Order No.: SIEA-C10171-01-5DCN
3159-SH906167-03250