Noark

400-109-2111

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Selection of Noark Products

Noark
Product Selection

Seek Services from Noark

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Product Selection

Focus on Noark

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Product Selection

Gathering the Excitement of Noark

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Product Selection

Noark

www.noark.cn

Ex9A-DC

DC Air Circuit Breaker

EXCELLENT PRODUCTS EXCEPTIONAL VALUE

Smart power, more than moving forward

Noark

Noark is a global company specializing in R&D, manufacturing and sales of intelligent electrical systems, focusing on power, new energy, rail transit, data center and other industries. It has provided hundreds of high-end customers with safe and reliable customized products, solutions and high-quality services.

Noark has three major R&D centers in Asia Pacific, North America and Europe, more than 20 logistics bases and 100 sales branches. There are more than 1500 employees worldwide, and R&D personnel account for over 18%. The products cover the whole series of intelligent power distribution products such as power distribution, control automation, terminal and complete sets, which are widely applied in more than 40 countries and regions, serving more than 1, 000 key engineering projects.

As one of the first low-voltage electrical appliance enterprises to obtain UL certification in China, it has successively obtained the authoritative certification of TÜV in Germany, KEMA in the Netherlands, CSA in Canada, NOM in Mexico and Lloyd's in Britain since its establishment. It has successively won the honors of national high-tech enterprise, national intellectual property demonstration enterprise, national SRDI "small giant" enterprise, and recognized by the Ministry of Industry and Information Technology of the People's Republic of China as "Shanghai Noark Intelligent Manufacturing Demonstration Factory for Low-voltage Apparatus".

In the future, with the corporate values of "respect, trust, cooperation, initiative and details", under the background of "double carbon" goal, Noark will actively practice the digital transformation construction, aiming at the segmentation field of low-voltage apparatus and become a well-known brand in North America and a leader in China's high-end industry market.

Global Number of Employees in Noark **1500+**

Proportion of R&D Technicians in Noark **18%**

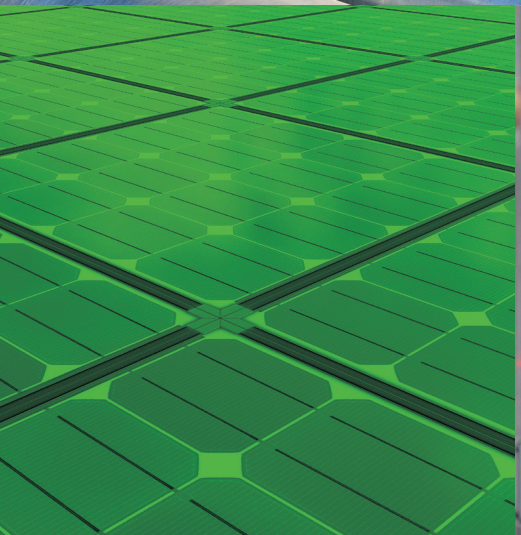
Three R&D Centers Worldwide
More than 20 Logistics Centers **3+20**

7 Branches in China **17**

Widely used in more than 40 countries around the world **40+**

Certified by Multiple Authorities Worldwide **UL/KEMA /TÜV**


洁雅克




203


Noark
250A


IDEAS
GRIP
WE STAND
BEHIND OUR
PRODUCTS

DC Air Circuit Breaker

1)Ex9A25DC

2)Ex9A40DC

1 Rated Current Range 630~2500A

Breaking Capacity (Icu):

DC 750V Icu=Ics=Icw=60kA

DC 750V Icu=Ics=Icw=65kA

DC 900/1000V Icu=Ics=Icw=55kA

DC 1250/1500V Icu=Ics=Icw=45kA

2 Rated Current Range 1600~4000A

Breaking Capacity (Icu):

DC 750V Icu=Ics=Icw=70kA

DC 900V/1000V Icu=Ics=Icw=55kA

DC 1250V/1500V Icu=Ics=Icw=50kA

DC Disconnector

1)Ex9ASD2500DC

2)Ex9ASD4000DC

1 Rated Current Range 630~2500A

Short time Withstand Current (Icw):

DC 750V Icw=45kA

DC 1000V Icw=45kA

DC 1250V/1500V Icw=45kA

2 Rated Current Range 1600~4000A

Short time Withstand Current (Icw):

DC 750V Icw=100kA

DC 1000V Icw=100kA

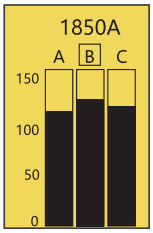
DC 1250V/1500V Icw=100kA

Ex9A

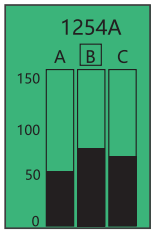
Tricolor Liquid Crystal Display

User-friendly Design

Trip



Alarm



Normal

Ambient Temperature

- Ex9A series air circuit breaker can work normally at -25°C~+40°C; If you need to work in the environment of -40°C~+70°C, please customize relevant products and use according to the temperature compensation coefficient table.

Storage Temperature

- With LCD controller -25°C~+75°C
- LED display controller or no controller -40°C~+85°C

Altitude

- Ex9A series air circuit breaker can work normally at an altitude below 2000m without affecting its characteristics; If it is necessary to install at an altitude of more than 2000m, it can be used according to the altitude factor derating meter.

Suitable for various environments

Humidity

- When the air temperature of Ex9A series air circuit breaker is +40°C, relative atmospheric humidity shall not exceed 50%. If the temperature is low, it can be used under the condition of higher humidity; The monthly average relative humidity in the wettest month is 90%; Consider the effect of condensation on the product surface caused by temperature change on the product performance during use.

Electromagnetic interference (EMC)

- Subject to the following disturbances:

  over-voltage due to circuit switching

  over-voltage due to atmospheric disturbances or ageing of power distribution systems

  Unlimited radio waves (radio, cell phone, radar, etc.)

  User-induced electrostatic discharge...

Pollution Level

- The pollution level of the service environment of Ex9A series air circuit breaker is Grade 3.

Ex9A series air circuit breaker guarantees:

- No false tripping occurs
- Trip time is not affected

Comprehensive certification

Ex9A circuit breakers and disconnectors comply with IEC/EN 60947 standards, as well as limit environmental test standards IEC60068-2.

- The circuit breaker complies with the standard

International Standards
IEC 60947-1 (General provisions)
IEC 60947-2 (Circuit Breaker)
IEC 60947-3 (Switch, isolation)

- Extreme environmental test standard

International Standards
IEC 60068-2-1 (Low temperature)
IEC 60068-2-2 (Dry heat)
IEC 60068-2-30 (Damp heat)

Complete certification

- The products have obtained various certifications in the electrical industry.

Safety certification mark for components and parts

EC CE Certification

Scheme of the IECEE for Mutual Recognition of Test Certificates for Electrotechnical Equipment and Components

A Highly Reliable Circuit Breaker

- Ex9A air circuit breaker passes the reliability verification under extreme environment and carries out special technical improvement after exciting the fault point, thus greatly improving the mechanical life and electrical life of the product; It makes the Ex9A a highly reliable circuit breaker.

Highly Intelligent Circuit Breaker

- Ex9A air circuit breaker is equipped with an advanced dual-core system architecture intelligent controller, which not only has absolutely reliable short-circuit current protection, but also has rich expansion functions

Ex9A

Excellent comprehensive performance

True zero flashover circuit breaker

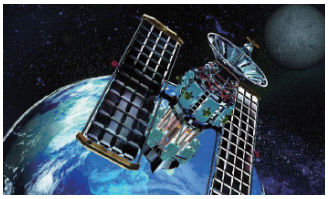
- NOARK's advanced magnetic arc-extinguishing technology, metal grid, multi-layer metal mesh cover and other arc-extinguishing technologies make Ex9A a true zero flashover air circuit breaker.

High Breaking Capacity

- The breaking capacity can cover 40~70kA to meet the requirements of different application occasions.

Powerful Communication Function

- It can realize functions of remote measurement, remote signaling, remote control and remote adjustment.



All-round Measurement and Maintenance

- Multiple Measurements: Power system parameters such as current, voltage, power, frequency, electric energy and harmonic
- Multiple Maintenance: Record of operation and maintenance parameters such as fault, alarm, operation, current, historical maximum and wear of switch contact

User-friendly interface

- LCD histogram real-time display data
- LCD tricolor backlight, real-time display of breaker status
- Double resetting function of parameters, support fine adjustment microUSB dual-function interactive interface, support power transmission and debugging

Rich expansion space

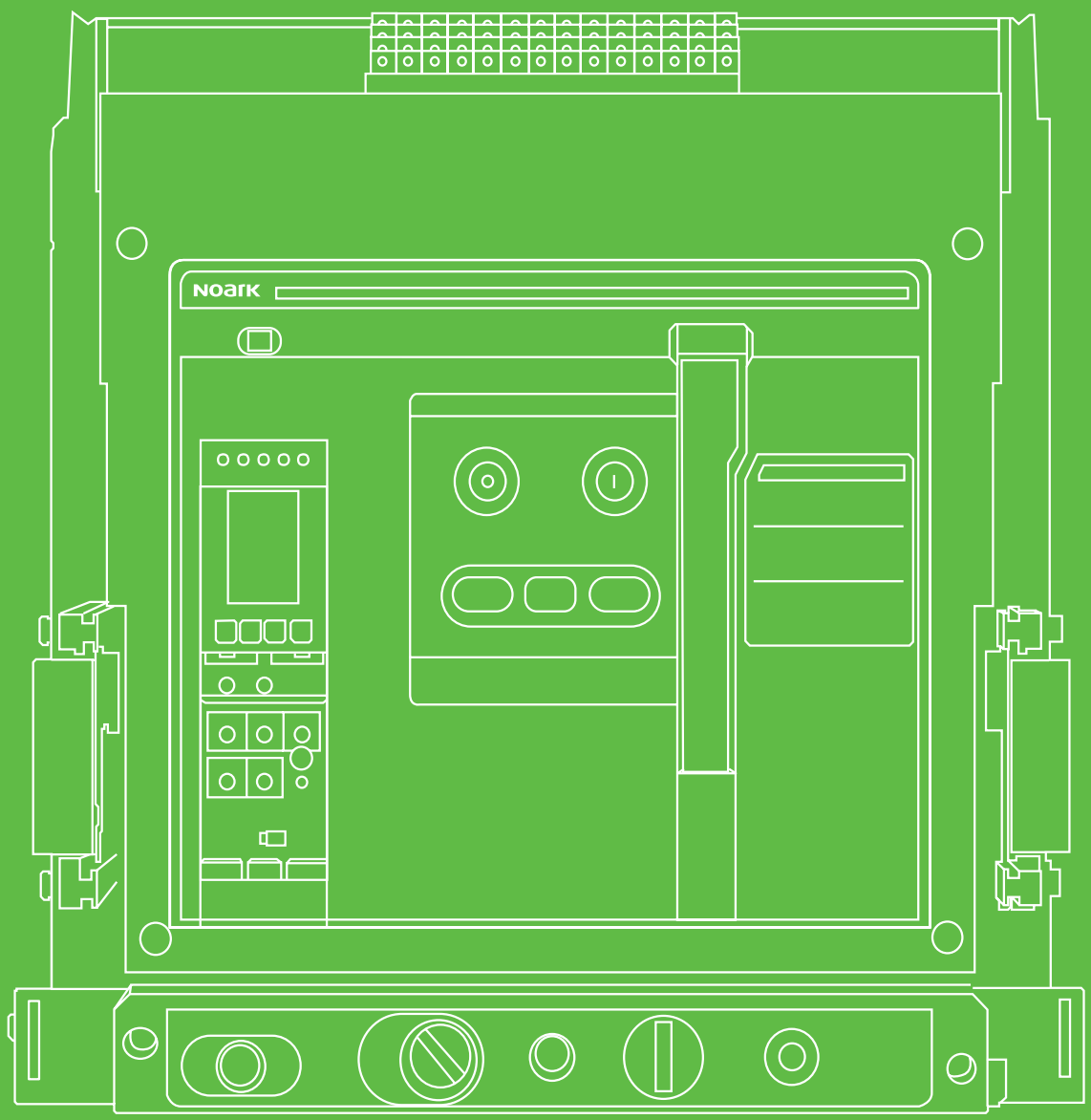
- Programmable relay signal unit

  Zone Selective Interlock (ZSI)

  Load Monitoring

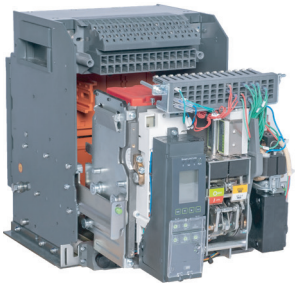
Ex9A

Air Circuit Breaker



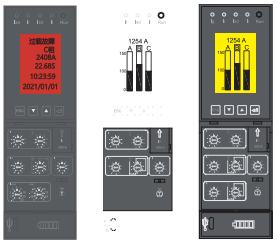
CONTENTS

Air circuit breaker



DC Air Circuit Breaker and DC Disconnector

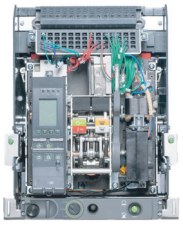
- Model of circuit breaker: Ex9A25DC, Ex9A40DC
  - Rated current: 630A~4000A
  - 3P and 4P
  - Drawer-type and fixed-type
- DC Disconnector: Ex9ASD-2500DC, Ex9ASD-4000DC
  - 3P and 4P
  - Drawer-type and fixed-type



Smart Unit Control Unit

- Low temperature type M
  - 3.0M three stage protection
  - 4.0M three stage protection + Ground fault protection
- Current type A (standard configuration)
  - 3.0A three stage protection
  - 4.0S three stage protection + Ground fault protection
- Green, yellow and red tricolor backlight liquid crystal display
  - Electric energy type P
  - 3.0P three stage protection
  - 4.0P three stage protection + Ground fault protection
  - Green, yellow and red tricolor backlight liquid crystal display

Excellent comprehensive performance



Circuit breakers and disconnectors

Standard Accessories:

Shunt Trip

Closing electromagnet

Energy storage motor

4 group of auxiliary

Optional Accessories

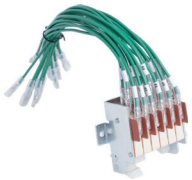
Under-voltage release and second shunt trip (one of two)

Key lock

Button locking device

Door interlock

Mechanical interlock



Contacts

Ready-to-close indication contact

Fault trip indication contact

6NO 6NC auxiliary contacts

Connect, test, disconnection indication contact

Signal Output

Programmable relay signal module

DC24V output power module

Connection

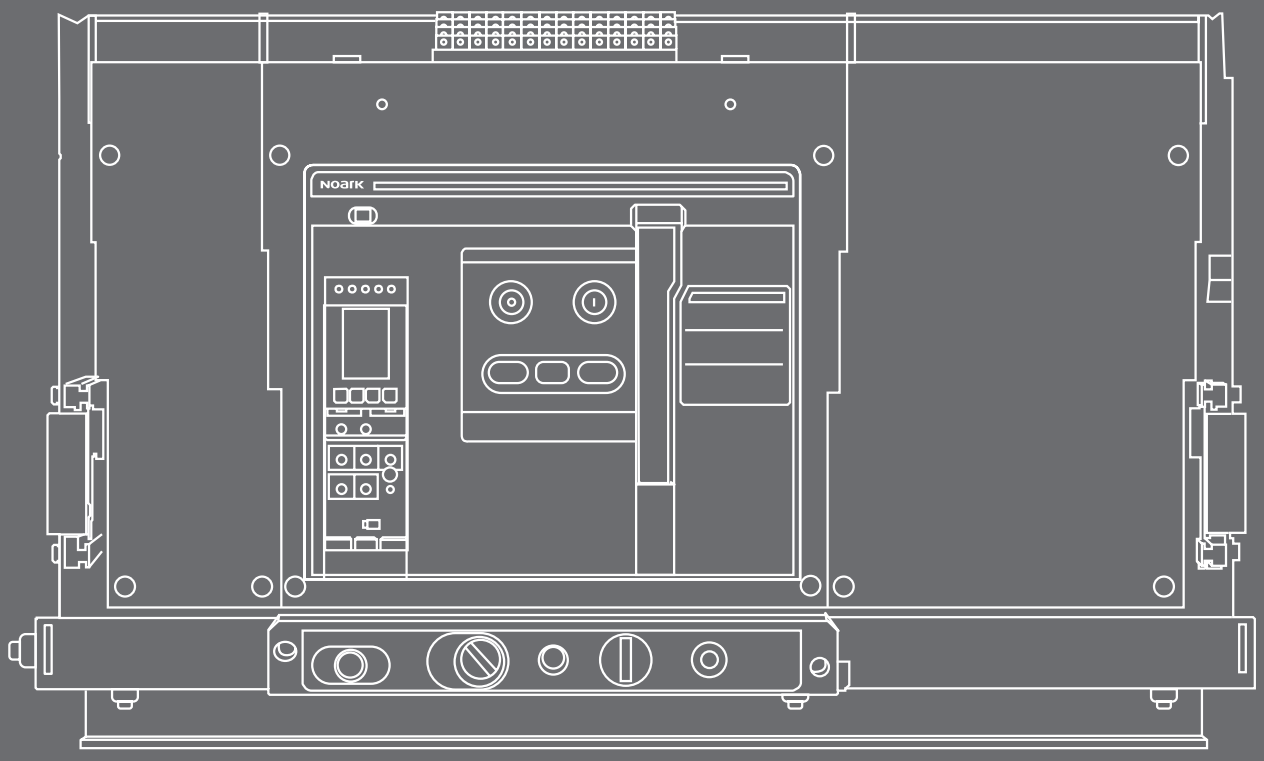
Horizontal Connection

Vertical Connection

Ex9A
Air circuit breaker

SELECTION AND ORDERING

A
01-02



Ex9A
Air circuit breaker

SELECTION AND ORDERING

A

Model Selection

Ex9A series DC Air Circuit Breaker

Ex9A	25	DC	3P	2500	D	A	SU30A	DC220	OTHER
9A Series	Frame	DC Type	Pole number code	Rated Current Code	Code of installation mode	Code of Wiring Mode	Code of Intelligent Controller	Code of power supply voltage of control circuit	Special requirement code
Ex9A: Air circuit breaker	25: 2500A	DC	3P: 3 poles 4P: 4 poles	630 800 1000 1250 1600 2000 2500	D: Drawer-type F: Fixed-type	A/B (3P wiring mode) C/D (4P wiring mode)	SU30A SU40A SU30P SU40P SU30M SU40M	AC230: AC 230V AC400: AC 400V DC220: DC 220V DC110: DC 110V	No special requirements No code here
	40: 4000A			1600 2000 2500 3200 3600 4000					

Examples of selection:

Ex9A25DC 3P 2500 DA SU30A DC220

Ex9A25DC 3P 2500 D A SU30A DC220 means Ex9A series 2500 frame, 3P, rated current 1250A, drawer-type, with 3.0A basic controller, control circuit power supply voltage is air circuit breaker of DC 220V.

Model Selection

Ex9ASD

Description on Selection of Ex9ASD Series DC Disconnector

Ex9ASD	2500DC	25	3P	D	A	DC220	OTHER
9ASD Series Generic Code	Frame Current (DC Application)	Rated Current	Pole number code	Code of installation mode	Wiring Type Code	Code of power supply voltage of control circuit	Special requirement code
DC Disconnector	2500DC	06: 630A	3P: 3 poles	D: Drawer-type	A: Type A wiring B: Type B wiring C: Type C wiring D: Type D wiring	AC230: AC 230V AC400: AC 400V	No special requirements No code here
		08: 800A					
		10: 1000A					
		12: 1250A					
		16: 1600A					
	4000DC		4P: 4 poles	F: Fixed-type		DC220: DC 220V DC110: DC 110V	The code or entry method of optional accessories can be noted here
		20: 2000A					
		25: 2500A					
		32: 3200A					
		40: 4000A					

Note

Rated current of 2500 frame is 630A~2500A;

Rated current of 4000 frame is 1250A~4000A;

3P products only have A, B type wiring mode, without C, D;

4P products only have C, D type wiring mode, without A, B;

Examples of selection:

Ex9ASD-2500DC20 4P F C DC220

Ex9ASD-2500 DC 20 4P F C DC220 means ordering one set of Ex9ASD-2500DC DC disconnector with rated current of 2000A, 4 Pole series connection, fixed-type, C type wiring, control circuit voltage DC220V. By analogy, the English space of the functional structure section shall be reserved according to the example requirements when coding.

Ordering Guide

Ex9ADC DC Series Ordering Guide

Basic Parameters

Frame Current	☐ Ex9A25DC ☐ Ex9A40DC
Number of Poles	☐ 3P(DC750V) ☐ 4P(DC750V DC900/1000V DC1250/1500V)
Installation Mode	☐ Fixed-type (F) ☐ Drawer-type (D)
Rated current	☐ Ex9A25D ☐630A ☐800A ☐1000A ☐1250A ☐1600A ☐2000A ☐2500A ☐ Ex9A40DC: ☐1600A ☐2000A ☐2500A ☐3200A ☐3600A ☐4000A
Connection Mode	☐ Horizontal Connection ☐ Vertical Connection

Controller Parameters

Controller Model	☐ SU30A ☐ SU40A ☐ SU30P ☐ SU40P ☐ SU30M ☐ SU40M
Controller Voltage	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V
Signal Unit	☐ 4DO without ZSI (standard configuration of electric energy type) ☐ 4DC+2DI with ZSI (harmonic standard configuration) ☐ ZSI interlocking (harmonic standard configuration)
Communication Function COM	☐ Modbus (AD power module and M6C relay module shall be added to realize remote control function)
Power Supply Module	☐ AC230V AC400V DC220V DC110V
Relay Module	☐ M6C

Standard Accessories

Energy Storage Motor (MD)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Closing Electromagnet (XF)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Shunt Trip (SHT)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Door Frame	☐ Fixed-type (CDP) ☐ Drawer-type (DDP)

Ordering Guide

Optional Accessories

Under-voltage Release	☐ Instantaneous ☐Delay ☐ AC230V ☐AC400V ☐DC220V ☐DC110V ☐DC24V ☐DC48V
Voltage loss release	☐ UVTZ11 ☐ AC380-415V ☐AC220-230V
Check the voltage closing device	☐ VCU ☐ AC220V ☐AC380V
Auxiliary Contact	☐ Four-group conversion (standard configuration) ☐Six-group conversion ☐ 4NO 4NC ☐6NO 6NC (Ex9A25~75)
Phase Barrier	☐ Fixed-type ☐Drawer-type
Position Indication	☐ Drawer-type position signal indicating device
Ready to close Contact	☐ Ready to close contact
Key lock	☐ One lock and one key ☐ Two locks and one key ☐Three locks and two keys
Door Interlock	☐ Door Interlock
Button locking device	☐ Button locking device
Cable Interlock	☐ Two Sets ☐Three Sets
Counter	☐ Counter

Ordering Guide

Ex9ADC DC Series Ordering Guide

Basic Parameters

Frame Current	☐ Ex9ASD 2500DC ☐Ex9ASD 4000DC
Rated current (A)	☐ Ex9ASD 2500DC: ☐ 630A ☐800A ☐1000A ☐1250A ☐1600A ☐ 2000A ☐ 2500A ☐ Ex9ASD 4000DC: ☐ 1250A ☐1650A ☐2000A ☐2500A ☐3200A ☐4000A
Number of Poles	☐ 3P ☐ 4P
Installation Mode	☐ Fixed-type (F) ☐ Drawer-type (D)
Connection Mode	☐ Horizontal Connection ☐Vertical Connection ☐ Mixed connection (connection mode shall be indicated)

Standard Accessories

Energy Storage Motor (MD)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Closing Electromagnet (XF)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Shunt Trip (SHT)	☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
DOOR FRAME	☐ Fixed-type (CDP) ☐Drawer-type (DDP)

Ordering Guide

Optional Accessories

Under-voltage Release	☐ Instantaneous ☐ Delay ☐ AC230V ☐ AC400V ☐ DC220V ☐ DC110V ☐ DC24V ☐ DC48V
Voltage loss release	☐ UVTZ11 ☐ AC380-415V ☐ AC220-230V
Check the voltage closing device	☐ VCU ☐ AC220V ☐ AC380V
Auxiliary Contact	☐ Four-group conversion (standard configuration) ☐ Six-group conversion ☐ 4NO 4NC ☐ 6NO 6NC (Ex9A25~75)
Phase Barrier	☐ Fixed-type ☐ Drawer-type
Position Indication	☐ Drawer-type position signal indicating device
Ready to close contact	☐ Ready to close contact
Key lock	☐ One lock and one key ☐ Two locks and one key ☐ Three locks and two keys
Door Interlock	☐ Door Interlock
Button locking device	☐ Button locking device
Cable Interlock	☐ Two Sets Three Sets
DC connection plate	☐ Ex9ASD 2500DC: ☐ 630~800A ☐ 1000~1250A ☐ 1600~2000A ☐ 2500A ☐ Ex9ASD 4000DC: ☐ 1250~1600A ☐ 2000~2500A ☐ 3200A ☐ 4000A
Counter	☐ Counter

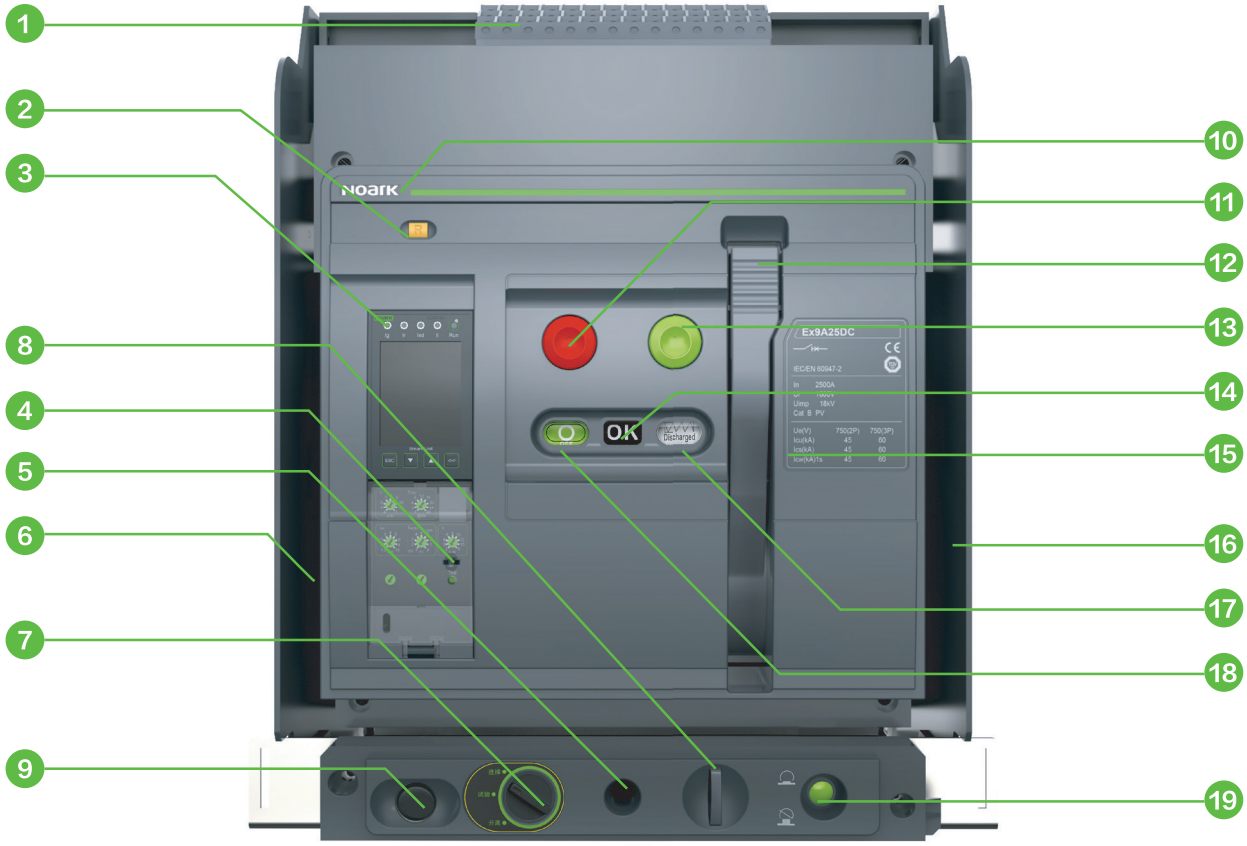
Ex9A
Air circuit breaker

Ex9A
Air circuit breaker

CIRCUIT BREAKERS AND DISCONNECTORS

B

Structural Characteristics



Structural characteristics

Structural Characteristics

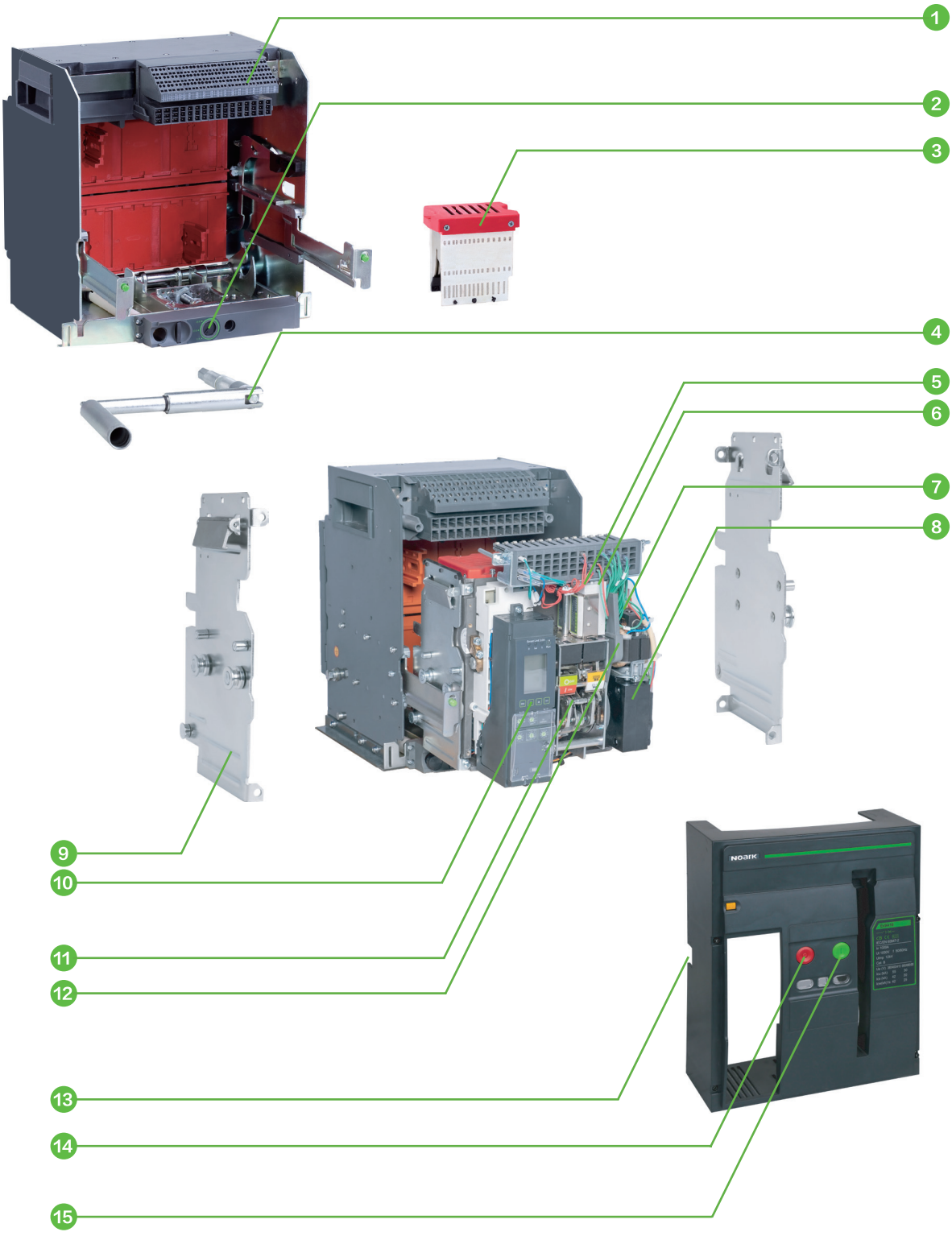
Identification

Ex9A series circuit breaker is classified into fixed-type and drawer-type, its side plate is made of steel plate, and the bottom frame is made of insulating bakelite, which can reduce the size of circuit breaker and make it delicate; Double insulation is adopted to isolate the live parts, enhance the safety, and the phases are completely separated from each other, so that the safe application of the product is ensured.

Its external structure and internal structure are as shown in the left figure

No.	Name
1	Terminal block for control circuit
2	Trip Reset Button
3	Intelligent Control Unit
4	Test Interface
5	Rocker Handle Working Hole
6	Guide Rail
7	Circuit breaker “disconnection”, “test” and “connection” position indicator
8	Padlock
9	Crank handle and storage hole
10	Trademarks
11	Opening button (O)
12	Manual energy storage handle
13	Closing button (I)
14	Closing readiness indication a. Ready b. Not Ready 
15	Nameplate
16	Pull out the pull plate
17	Energy storage/energy release indication A. Store Energy B. Release Energy 
18	Main contact position indication, a Opening b. Closing 
19	Drawer seat position lock (manually reset the handle before shaking it after popping up)

Structural Characteristics



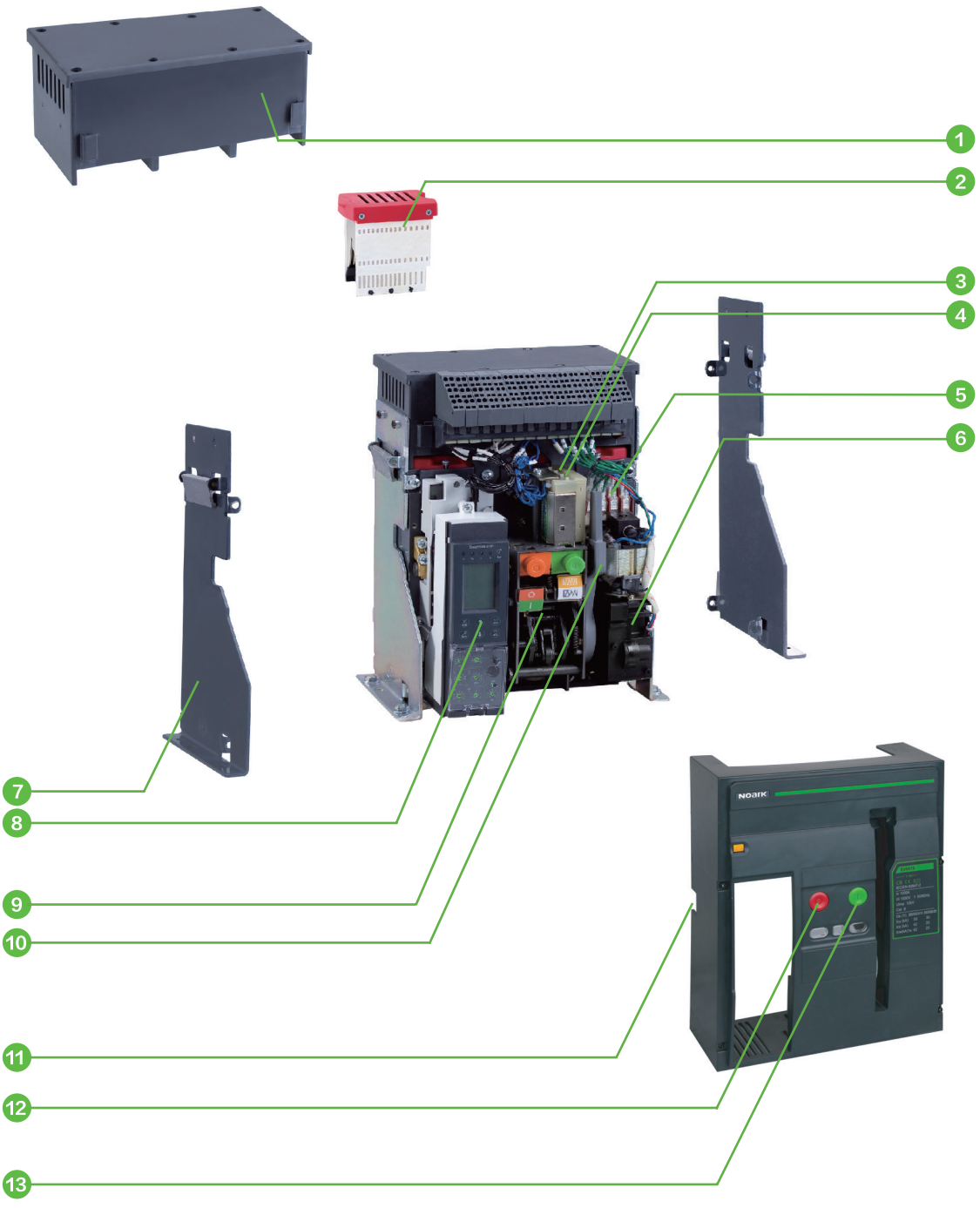
Structural characteristics

Modularity

- Drawer-type Air Circuit Breaker

No.	Name
1	Terminal block for control circuit
2	Drawer Seat Position Indication
3	Arc-extinguishing chamber
4	Crank handle
5	Shunt Trip (SHT)
6	Closing electromagnet (XF)
7	Auxiliary Contact (AX)
8	Energy storage motor (MD)
9	Side plate
10	Intelligent controller
11	Operating Mechanism
12	Manual energy storage handle
13	Circuit breaker mask
14	Opening button
15	Closing button

Structural Characteristics



Structural characteristics

Modularity

- Fixed-type Air Circuit Breaker

No.	Name
1	Insulation cover
2	Arc-extinguishing chamber
3	Shunt Trip (SHT)
4	Closing electromagnet (XF)
5	Auxiliary Contact (AX)
6	Energy storage motor (MD)
7	Side plate
8	Intelligent controller
9	Operating Mechanism
10	Manual energy storage handle
11	Circuit breaker mask
12	Opening button
13	Closing button

Technical Data

Ex9ADC DC Air Circuit Breaker			Ex9A25DC		Ex9A40DC	
Frame Current			2500		4000	
Number of Poles			3P/4P			
Installation Mode			Drawer-type /Fixed-type			
Rated Working Voltage Ue(V)			DC750, DC900/1000, DC1250/1500			
Rated Current +40 ℃ In(A)			630/800/1000/1250/1600/2000/2500		1600/2000/2500/3200/3600/4000	
Rated Insulation Voltage Ui(V)			1600		2000	
Rated Impulse Withstand Voltage Uimp (kV)			18			
Rated ultimate short-circuit breaking capacity Icu(kA)		DC750V(3P)	60		70	
		DC750V(4P)	65		-	
		DC900V/1000V	55		55	
		DC1250V/1500V	45		50	
Rated ultimate short-circuit breaking capacity Ics(kA)		DC750V(3P)	60		70	
		DC750V(4P)	65		-	
		DC900V/1000V	55		55	
		DC1250V/1500V	45		50	
Rated short time withstand current Icw(kA)		DC750V(3P)	60		70	
		DC750V(4P)	65		-	
		DC900V/1000V	55		55	
		DC1250V/1500V	45		50	
Operation Time (ms)		Breaking	20~30			
		Making	< 70			
Flashover Distance			0			
Service Life	Mechanical	Maintained	30000		20000	
		Maintenance-free	15000		10000	
	Electrical	DC750V	5000		4000	
		DC900V/1000V	3000		1000	
		DC1250V/1500V	2000		800	
Connection Mode			Horizontal/Vertical			
Dimensions (W×D×H) (mm)		Fixed-type 3P	370×310×392		430×310×392	
		Fixed-type 4P	465×310×392		575×310×392	
		Drawer-type 3P	375×396.5×426.5		439×406.5×426.5	
		Drawer-type 4P	470×396.5×426.5		554×406.5×426.5	
Current range (A)			630~1600	2000~2500	1600~2500	3200~4000
Net weight (kg)		Fixed-type 3P	43	45	50	53
		Fixed-type 4P	53	55	66	70
		Drawer-type 3P	75	80	75	80
		Drawer-type 4P	95	98	120	135

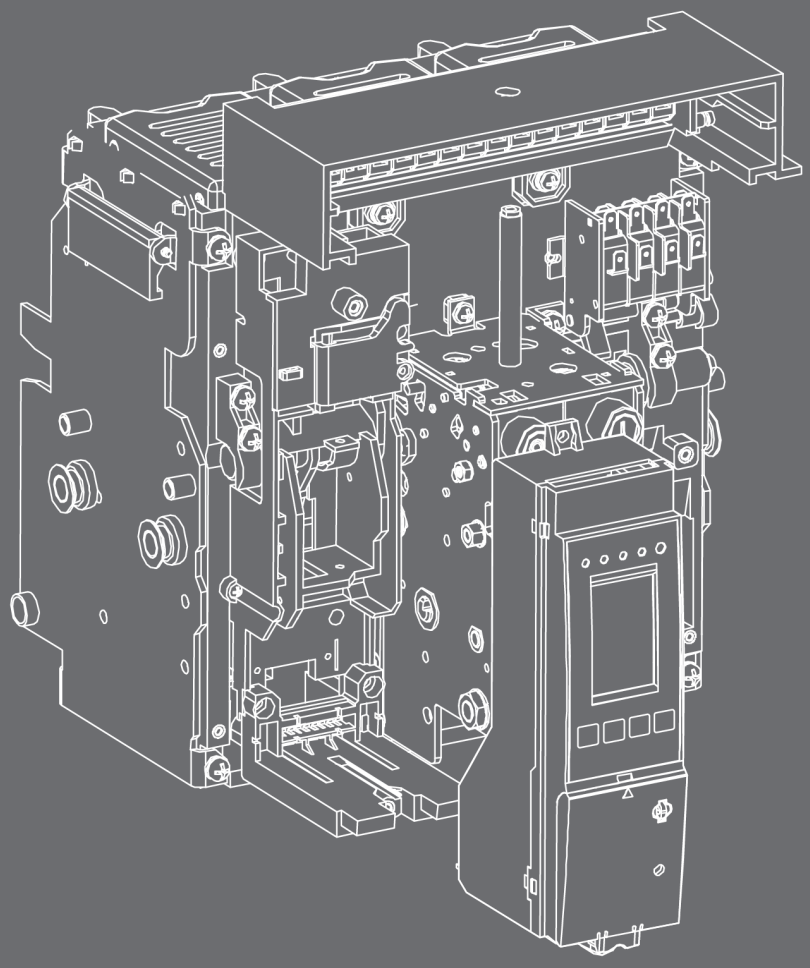
Technical Data

Ex9ASD Series DC Disconnector			Ex9ASD 2500DC		Ex9ASD 4000DC	
Electrical performance						
Number of Poles			3P/4P			
Installation Mode			Drawer-type /Fixed-type			
Rated Working Voltage Ue(V)			DC750(3P)/DC1000(4P)/DC1500(4P)		DC750/1000(3P)/DC1250/1500(4P)	
Rated Current +40℃ In(A)			630-800-1000-1250-1600-2000-2500		1250-1600-2000-2500-3200-4000	
Rated Insulation Voltage Ui (V)			1600			
Rated Impulse Withstand Voltage Uimp (kV)			12			
Rated short-time withstand current Icw(kA)1s		DC750V	45		100	
		DC1000V	45		100	
		DC1250V/1500V	45		100	
Rated short-circuit making capacity (peak value) Icm(kA)		DC750V	80		100	
		DC1000V	52.5		100	
		DC1250V/1500V	45		100	
Operation Time (ms))		Breaking	≤30			
		Making	≤70			
Flashover Distance			0			
Service Life (C~O)	Mechanical	Maintained	30000		20000	
		Maintenance-free	15000		10000	
	Electrical	DC750V	5000 (time constant 2ms)		4000 (time constant 2ms)	
		DC1000V	3000 (time constant 7.5ms)		1000 (time constant 2ms)	
		DC1500V	3000 (time constant 2ms) 2000 (time constant 7.5ms)		800 (time constant 7.5ms)	
Isolation function			■			
Connection and installation			DC isolation			
Use category			DC-22A/DC-23A/DC-PV2			
Installation category			IV			
Pollution Level			III			
Connection Mode			Horizontal/Vertical/Mixed			
Incoming line mode			Up/Down			
Dimensions (W×D×H) (mm)		Fixed-type 3P	370×390×311		425×390×311	
		Fixed-type 4P	465×390×311		539×390×311	
		Drawer-type 3P	375×406.5×426		437×426.5×406.5	
		Drawer-type 4P	470×406.5×426		552×426.5×406.5	
Current range (A)			630~1600	2000~2500	1250~2500	3200~4000
Net weight (kg)		Fixed-type 3P	43	45	50	53
		Fixed-type 4P	53	55	66	70
		Drawer-type 3P	75	80	75	80
		Drawer-type 4P	95	98	120	135

Ex9A
Air circuit breaker

SMART UNIT
INTELLIGENT
CONTROLLER

C
01-02



Ex9A
Air circuit breaker

INTELLIGENT CONTROLLER UNIT

C

Introduction of Intelligent Control Unit

Naming of Smart Unit

3 . 0 A

a b c

a Protection Type

☐ 3: Three-stage protection
☐ 4: Three-stage protection + Ground fault protection

b Control unit design version

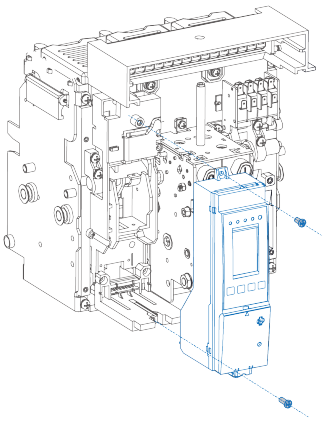
☐ "0" is the first version

c Measurement Type

☐ M: Low temperature type
☐ A: Current Type
☐ P: Electric energy type

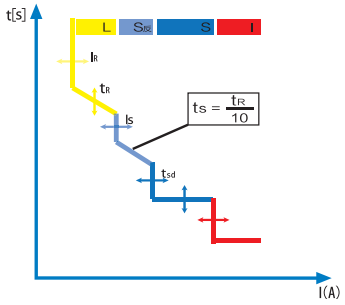
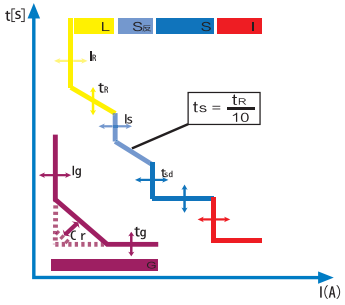
Classification of Smart Unit

- Smart Unit is the core component of the Ex9A series air circuit breakers and is specifically designed to protect the power system and loads. Each Ex9A circuit breaker is equipped with a Smart Unit and can be changed and upgraded according to customer needs and application requirements. Smart Unit is mainly used for power distribution protection, so as to protect lines and power supply equipment from the hazards of overload, short-circuit, ground fault/leakage, current imbalance, over-voltage, under-voltage, voltage imbalance, over-frequency, under-frequency, reverse power and other faults. The system can realize reasonable operation of the power grid through functions such as load monitoring, demand protection and ZSI, can also measure power grid parameters such as current, voltage, power, frequency, electric energy, demand and harmonic of power grid nodes, and record operation and maintenance parameters such as fault, alarm, operation, historical maximum current value and wear condition of switch contacts. In addition, when the power network is used for communication networking, Smart Unit is also the remote terminal of the power automation network, which plays a role in remote telemetry, remote signaling, remote control and remote regulation, and supports various protocols to meet various networking requirements.
- Tricolor screen display (A, P type): Green Normal; Yellow Alarm; Red Fault Trip.
- Realize stepless setting of parameters, set the knob for coarse adjustment and press the button for fine adjustment.
- Realize all-round measurement and maintenance, with powerful functions and simple operation, and easy to configure functions.



M: Low temperature type	Long time delay, short delay, instantaneous, grounding protection, I unbalance, MCR, HSISC, temperature protection. Measure the instantaneous value, maximum value, current unbalance rate and current heat capacity value of each phase. LED display. Optional communication function.
A: Current Type	Long time delay, short delay, instantaneous, Ground fault/leakage protection, I unbalance, MCR, HSISC. Contact wear recording, temperature protection, neutral line protection, clock function. Measure the instantaneous value, maximum value, current unbalance rate and current heat capacity value of each phase. Green-yellow-red LCD display.
P: Electric energy type	Contains all functions of current mode A. Add under-voltage and over-voltage protection, U-unbalance protection, under-frequency and over-frequency protection, phase sequence protection and load monitoring. Measure the voltage instantaneous value, average value, frequency, voltage unbalance rate and phase sequence detection of each phase. Add reverse power protection. Measure power, power factor, total electric energy, input electric energy, output electric energy, and resettable electric energy. Green-yellow-red LCD display. Standard Configuration: Signal output unit and communication function.

Introduction of Intelligent Control Unit

Basic current protection	
3.0 L S I protection	4.0 L S I G protection
	
3.0 A	4.0
3.0 P	4.0 P
3.0 M	4.0 M

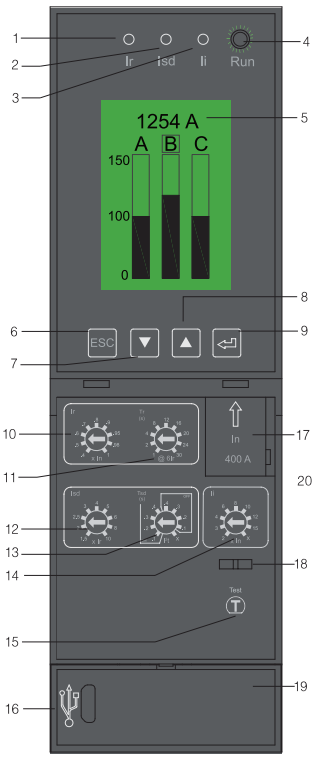
Introduction of Intelligent Control Unit

Ex9ADC DC Series Ordering Guide

Basic Parameters

- Reliability
  High-performance chip design is used to effectively ensure the high reliability of basic four-segment protection function and the reliable application of extended functions such as measurement and communication.
- Selective Protection
  As the most basic model of Smart Unit series control unit, Smart Unit 3.0A can fully realize the functions of 3-segment selective protection (LSI) and current meter, and meet different requirements of customers.
- Double Setting
  The knob setting can realize coarse adjustment, and the key can realize fine adjustment to meet the protection of the whole line section.
- Neutral Line Protection
  All Smart Unit control units are equipped with five neutral line protections: 50%, 100%, 150%, 200%, off, so as to meet different neutral line protection requirements.
- Simulate traffic light indication to realize user-friendly fault indication
  The tricolor graphic LCD and the LED fault indicator light closely cooperate to indicate the system fault, so that the maintenance is more timely, safer and more reliable.

Smart Unit 3.0



Indicators	
1	Ig indicator light: The ground fault trip light is on
2	Ir indicator light: Light flashes in case of overload with long time delay, light always on after tripping with long time delay
3	Isd indicator light: Light on for short-circuit short-time delay trip
4	Ii indicator light: Light on for short-circuit instantaneous trip
5	Operation indicator light: Flash during normal operation
6	Type A, P: LCD display, M-type LED display
Key	
7	Return key: Exit the current menu to enter the previous menu, or cancel the current set parameter value
8	Down Key: Move the menu box down or set the parameter "-"
9	Up Key: Move the menu box upwards or set the parameter "+"
10	OK Key: Enter the menu below the selected box or activate a box to modify the numbers in the box
Regulating interface	
11	Long delay current setting Ir
12	Long time delay trip delay setting Tr
13	Short-circuit short-delay tripping current setting Isd
14	Short-circuit short delay trip delay setting Tsd
15	Short-circuit instantaneous trip current setting Ii
16	Ground fault current setting Ig
17	Ground fault trip time setting Tg
18	Test button: Tripping test button
19	USB connection port
20	Current plug-in module
21	Lock hole of transparent cover

- Operation Indicator Light
  The control unit is equipped with a Run indicator light to indicate the working state of the control unit in real time, provide customers with real-time updates on the operation of the control unit, so that the user can be more assured to use the control unit.
- Current Indication
  User-friendly current histogram, real-time display of each phase current value, record and retain parameters like the maximum value, convenient for system parameter analysis and maintenance.
- Signal Unit
  The optional signal unit can realize 18 kinds of alarm output remotely; 4DO&2DI can realize selective protection of ZSI.
- Rated Current Module
  Matching with changing application scenarios, optional rated current modules can be selected for more accurate control.

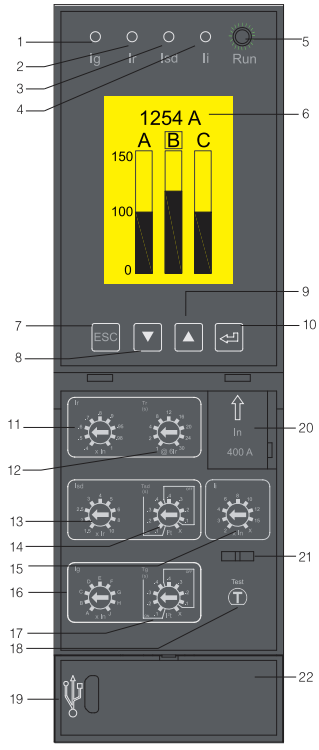
Introduction of Intelligent Control Unit

- Load Monitoring
  Two different load monitoring methods can be selected: Unload two circuit load, unload and connect one circuit load respectively to realize unloading of unimportant load in case of overload and prevent frequent tripping of the system.
- Measurement
  Select different types of control units to realize the measurement of different electrical parameters, and add the function protection related to the corresponding parameters, so as to meet the requirements of different customers, and save the cost; For example: Harmonic can realize the measurement of harmonic parameters, realize current harmonic protection and voltage harmonic protection, and provide reliable guarantee for complex non-linear load use environment.
- Communication
  Optional Modbus communication protocol realizes remote communication, making low-cost monitoring system possible.

Smart Unit 4.0

- Meet all functions and features of Smart Unit 3.0.
- Ground fault protection
  Add the ground fault protection function, and the ground fault protection function can be closed through the setting knob, and the protection is more flexible. Two different ways of ground fault protection can be achieved: Differential type ground fault protection and ground current type ground fault protection make the protection more flexible and reasonable. The inverse time limit coefficient of ground fault protection can be adjusted to make the ground fault protection meet the requirements of inverse time limit and the selectivity of ground fault protection.
- ZSI
  The use of 4DO&2DI signal unit can not only realize short-time delay area interlocking, but also realize selective protection of ground fault protection area interlocking.
- Ground fault Alarm
  Add the ground fault alarm function, which is independent of the ground fault protection. The ground alarm function can set different parameters and close the function through the key, and can alarm remotely through the signal output unit.

Smart Unit 4.0



Indicators	
1	Ig indicator light: The ground fault trip light is on
2	Ir indicator light: Light flashes in case of overload with long time delay, light always on after tripping with long time delay
3	Isd indicator light: Light on for short-circuit short-time delay trip
4	Ii indicator light: Light on for short-circuit instantaneous trip
5	Operation indicator light: Flash during normal operation
6	Type A, P: LCD display, M-type LED display
Key	
7	Return key: Exit the current menu to enter the previous menu, or cancel the current set parameter value
8	Down Key: Move the menu box down or set the parameter "-"
9	Up Key: Move the menu box upwards or set the parameter "+"
10	OK Key: Enter the menu below the selected box or activate a box to modify the numbers in the box
Regulating interface	
11	Long delay current setting Ir
12	Long time delay trip delay setting Tr
13	Short-circuit short-delay tripping current setting Isd
14	Short-circuit short delay trip delay setting Tsd
15	Short-circuit instantaneous trip current setting Ii
16	Grounding fault current setting Ig
17	Grounding fault trip time setting Tg
18	Test button: Tripping test button
19	USB connection port
20	Current plug-in module
21	Lock hole of transparent cover

Ex9ADC DC Series Ordering Guide

Function		M (Basic)	A (Current Type)	P (Electric Energy Type)
Overload Protection	Overload long time delay protection	●	●	●
	Overload Pre-alarm	●	●	●
	Short-circuit short-time delay protection	●	●	●
	Short-circuit instantaneous protection	●	●	●
	Ground Fault Protection	● 4.0	● 4.0	● 4.0
	Current unbalance protection	●	●	●
	MCR and HSISC Protection	●	●	●
	Over-Voltage Protection	/	/	●
	Under-Voltage Protection	/	/	●
	Thermal Memory Function	●	●	●
Measurement Function	Current measurement	●	●	●
	Voltage measurement	/	/	●
	Power measurement	/	/	●
	Electric energy measurement	/	/	●
Maintenance Function	Test Function	●	●	●
	Record of Operation Times	●	●	●
	Trip record	●	●	●
	Alarm Record	●	●	●
	Displacement record	●	●	●
	Contact Wear Record	/	●	●
Additional Functions	Load Monitoring	/	/	●
	Zone Selective Interlocking	/	/	●
	RS485 Communication Function	●	●	●
	DI Input	/	/	●
	DO output	/	/	●
Human Machine Interface	Clock Function	/	●	●
	LED display	●	/	/
	LED Status Indication	●	●	●
	Key Operation	●	●	●
	Knob Setting	●	●	●
	USB Test Interface	●	●	●

Ex9ADC DC Series Ordering Guide

Overload long time delay protection

Setting Parameter	Setting Range								
Current setting value Ir	(0.4-0.5-0.6-0.7-0.8-0.9-0.95-0.98-1.0)xIn								
Time Setting Value Tr@6Ir	1s, 2s, 4s, 8s, 12s, 16s, 20, 24s, 30s								
Line Current	Action Time (s)								Time deviation
< 1.05Ir	No action for 2h								-
>1.3Ir	<1h action								±10% or intrinsic absolute deviation ±40ms, whichever is greater
1.5Ir	16	32	64	128	192	256	320	384	480
2.0Ir	9	18	36	72	108	144	180	216	270
6.0Ir	1	2	4	8	12	16	20	24	30
Thermal Memory Adjustable: Instantaneous, 1~30min									

Inverse time action characteristic of long time delay overcurrent protection, meeting

Tr: Long delay setting time;

Ir: Long delay setting current;

I: Actual current;

T: Long delay actual action time

Short-circuit short-time delay protection

Short-circuit short delay protection includes definite time limit and inverse time limit protection, which can be set through knob.

Setting Parameter		Setting Range		
Definite Time Limit	(1.5-2-2.5-3-4-5-6-8-10)xIr			0.1-0.2-0.3-0.4
Inverse Time Limit				
Close				X (OFF)
Action Characteristic	Error	Line Current	Action time (s)	Time deviation
Definite Time Limit	±15%	< 0.9Isd	No action	±10% or intrinsic absolute deviation ±40ms, whichever is greater
		≥1.1Isd	0.1, 0.2, 0.3, 0.4	
Inverse Time Limit		< 0.9Isd	No action	
		≥1.1Isd and ≤10Ir	$t=\frac{(10Ir)^2}{I^2}\times Tsd$	
		>10Ir	The action time is in accordance with the fixed time limit.	

Instantaneous Protection

Setting current Ii	Norm	Line Current	Action Characteristic
(2-3-4-6-8-10-12-15)xIn + X(OFF)	±10%	I < 0.9Ii	No action
		I≥1.1Ii	Instantaneous action, action time ≤100ms

Smart Unit Function

Product Classification and Function Configuration

Definition of Ig										
Rated current In	A	B	C	D	E	F	G	H	J	Remarks
400A < In≤1200A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	xIn
In > 1200A	500A	640A	720A	800A	880A	960A	1040A	1120A	1200A	

Setting Type	Setting Time Tg (S)
Definite Time Limit	0.1-0.2-0.3-0.4
Inverse Time Limit	
Close	X(OFF)

Action Characteristic	Deviation	Line current	Action time (s)	Time deviation
Definite Time Limit	±10%	< 0.9Ig	No action	±10% or ±40 ms (inherent absolute deviation), whichever is greater
		≥1.1Ig	0.10.2, 0.3, 0.4	
Inverse Time Limit		< 0.9Ig	No action	
		≥1.1Ig and (I<In or 1200A)	or	
		≥1In or 1200A	The action time is in accordance with the fixed time limit.	

Current Unbalance Protection

Current Imbalance				
	Min.	Max.	Setting step size	Remarks
Start Set Value	5	60	1%	
Startup Time Delay	0.1	40	0.1s	
Return To Set Value	5	Start set value	1%	This item is meaningful only when an alarm is given, and the return value ≤ the start value
Return Time Delay	10	200	1s	
Execution mode	Alarm/Trip/Close			

Voltage Protection

Under-voltage protection

Under-voltage protection				
	Min.	Max.	Setting step size	Remarks
Start Set Value	100V	Return value	1V	
Startup Time Setting	0.2s	60s	0.1s	
Return Value Setting	Start value	1500V	1V	This item is only meaningful when the execution mode is set to alarm
Return Time Setting	0.2s	60s	0.1s	
Execution Mode	Off/Alarm/Trip			

Over-voltage Protection

over-voltage protection				
	Min.	Max.	Setting step size	Remarks
Start set value	Return value	1500V	1V	
Startup time setting	0.2s	60s	0.1s	
Return value setting	100V	Start value	1V	This item is only meaningful when the execution mode is set to alarm
Return time setting	0.2s	60s	0.1s	
Execution mode	Off/Alarm/Trip			

Voltage Protection

Under-voltage Protection

Under-voltage protection				
	Min.	Max.	Setting step size	Remarks
Start set value	100V	Return value	1V	
Startup time setting	0.2s	60s	0.1s	
Return value setting	Start value	1500V	1V	This item is only meaningful when the execution mode is set to alarm
Return time setting	0.2s	60s	0.1s	
Execution mode	Off/Alarm/Trip			

Over-voltage Protection

Load Monitoring				
		Setting range	Setting step size	Remarks
Mode I	Load 1 start set value	(0.2 ~ 1)Ir	%1Ir	Ir is the overload long delay setting value
	Load 1 start time delay	(20% ~ 80%)Tr	1%Tr	Tr is the overload long delay action time
	Load 2 start set value	(0.2 ~ 1)Ir	%1Ir	
	Load 2 start time delay	(20% ~ 80%)Tr	1%Tr	
Mode II	Start set value	(0.2 ~ 1)Ir	%1Ir	
	Startup time delay	(20% ~ 80%)Tr	1%Tr	
	Return to set value	0.2Ir~Start Value	%1Ir	
	Return time delay	10s ~ 600s	1s	
	Alarm mode: DO output	A DO can be set to “Load I Trigger”, “Load II Trigger”, or “Load I Recovery”		
	Execution mode	Mode I/Mode II/Closed		

The load monitoring function can be used for pre-alarm and branch load control. The action is based on the current, and there are two options:

Mode I: Two loads can be controlled independently. When the operating parameter exceeds the setting value, the DO port delay action triggered by load I and load II is correspondingly set to control and break the two branch loads to ensure the power supply of the main system.

Mode II: Only one load is controlled, and when the running parameter exceeds the starting value, the DO port delay action triggered by the load one is correspondingly set to cut off the branch load; If the running parameter value is lower than the return value after breaking, set the DO port as load one recovery delay action to enable the branch load to supply power again.

Measurement

Current measurement		Standard Configuration
Measurement Mode	Measurement of instantaneous current values, including: I1, I2	
	Ground fault current Ig, current unbalance rate Iun	
	Suitable for DC networks	
Measurement Range	I1, I2 to 20In	
	Ground fault (4.0): 10 times the current rating	
Voltage Measurement		**Type P has this function**
Measurement Mode	Measure DC voltage	
Measurement Range	100V-1500V	
Measurement Accuracy	±1%	
Power Measurement		**Type P has this function**
Measurement Range	0KW~65535KW	
Electric Energy Measurement		**Type P has this function**
Measurement Range	0KWh~4294967295KWh	

History and maintenance

Current Alarm
The current front alarm interface displays all alarm categories that place the controller in an alarm state.

Alarm Category
Alarm categories include overload pre-alarm, current imbalance alarm, under-voltage alarm, over-voltage alarm, power alarm and DI input alarm.

Number of operations
The operation times interface displays the number of total opening and closing operations of the switch, and each opening + closing operation is one operation number.

Contact Wear
The contact wear interface displays the current contact wear of the switch, indicating the customer of service life of the switch. When the contact wear exceeds 100%, the customer needs to replace the switch to ensure the reliable operation of the power distribution system.

Displacement Record
The displacement recording interface displays the types and time of 10 historical displacements, including closing, opening and tripping.

Trip Record
The tripping record interface displays the type, time and various information of 10 trips in history.
The alarm record interface displays the type, time and various information of 10 trips in history.

Precautions
When using the dial switch to adjust the setting parameters of the controller, make sure that the LCD or LED screen display value is consistent with the setting value.

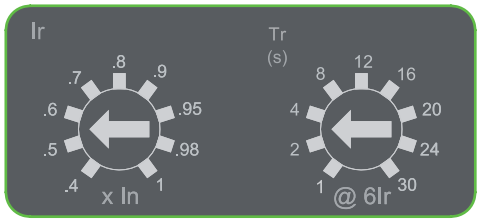
Smart Unit Function

Measurement

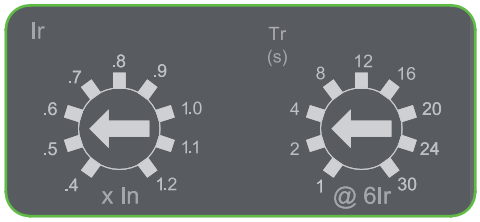
Current measurement	Standard Configuration:
Measurement mode	Measurement of instantaneous current values (rms), including: I1, I2, I3, and IN
	Ground fault current Ig, leakage current I △n, current unbalance rate Iunbal
	Automatic tracking frequency change, suitable for 50Hz and 60Hz power grid
Measurement range	Ia, Ib, Ic and IN not less than 25 times In (circuit breaker rated current)
	Ground fault (4.0), 10 times leakage current rating (5.0)
Measurement accuracy	Within the range of 2In, the deviation is ±2%; ±5% above 2In
	The intelligent control unit displays the current values of A, B and C in a bar graph and indicates the percentage of each current relative to the overload set value
Voltage measurement	**Standard configuration of voltage type and above**
Measurement mode	True RMS measurement of each phase line voltage, phase voltage and voltage unbalance rate Uunbal
	Voltage phase sequence, automatic tracking power grid frequency change, applicable to 50Hz and 60Hz power grid
Measurement range	Line voltage: 0~1200V
	Phase voltage: 0~600V
Measurement accuracy	±1%
Frequency	**Standard configuration of voltage type and above**
Measurement range:	40Hz ~ 65Hz
Deviation:	±0.1Hz
Note: Frequency signal is taken from phase A voltage	
Power	**Standard configuration of electric energy type and above**
Measurement mode	True active, true reactive mode
Measurement content	System active power, reactive power, apparent power
	Split-phase active power, reactive power, apparent power (not applicable to three-phase three-wire system)
Measurement range	Active: -32768kW~+32767Kw
	Reactive: -32768kar~+32767kar
	Apparent: 0kVA~65535kVA
	Deviation: ±3.0%
Power factor	**Standard configuration of electric energy type and above**
Measurement content	System power factor
	Split phase power factor (not applicable for three-phase three-wire system)
Measurement range	-1.00 ~ +1.00
	Deviation: ±0.04
Electrical energy	**Standard configuration of electric energy type and above**
Measurement content	Input active energy (EPin), input reactive energy (EQin)
	Output active energy (EPout), output reactive energy (EQout)
	Total active energy (EP), total reactive energy (EQ), total apparent energy (ES)
Measurement range	Active: 0~4294967295kWh
	Reactive: 0~4294967295kvarh
	Apparent: 0~4294967295kVAh
Measurement accuracy	The deviation of electric energy display is ±3.0%
Harmonic measurement	**Harmonic standard configuration**
Fundamental measurement	Current fundamental: Ia, Ib, Ic and IN
	Voltage fundamental: Uab, Ubc, Uca and Uan, Ubn, Ucn
Total harmonic distortion THD and thd	THD: Total harmonic distortion relative to fundamental
	Thd: Total harmonic distortion relative to the RMS current
Amplitude spectrum of harmonics	The intelligent control unit can display the FFT amplitude of odd harmonics from 3 to 31 times, which displays the harmonic amplitude of different frequencies in the form of a rectangular diagram to form the spectrum analysis of the harmonic.
Waveform and waveform capture	The intelligent control unit uses digital sampling technology similar to the oscilloscope to capture the waveform of current and voltage. The waveform capture is a method for detecting the weak link in the system and equipment, and by capturing the information displayed by the waveform, the harmonic level and the direction and amplitude of the harmonic can be determined. The user can manually browse the following waveform: 3 currents Ia, Ib, Ic, 3 line voltages Uab, Ubc, Uca.

Overload long time delay protection

Power distribution protection setting



Generator protection setting



Associated parameters

- Ir:
  Long delay action current setting value;
  Distribution protection: Knob adjustable gear: (0.4-0.5-0.6-0.7-0.8-0.9-0.95-0.98-1)×In;
  Generator protection: Knob adjustable gear: (0.4-0.5-0.6-0.7-0.8-0.9-1.0-1.1-1.2)×In.
- Tr:
  Long delay convention trip time, @6Ir;
  Knob adjustable gear: 1s-2s-4s-8s-12s-16s-20s-24s-30s.

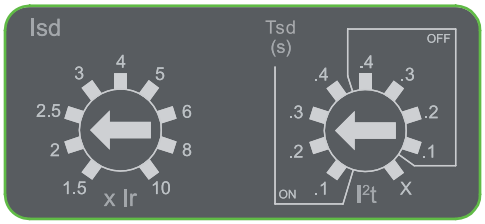
Technical data

Setting range Ir	Error	Line current I	Action time Tr (s)	Time deviation
Distribution protection: (0.4~1)In Generator protection: (0.4~1.2)In	±10%	<1.05Ir	No action for 2h	±15%
		>1.30Ir	<1h action	
		1.5Ir	Comparison table: 16 32 64 128 192 256 320 384 480	
		2.0Ir	9 18 36 72 108 144 180 216 270	
		6.0Ir	Setting value: 1 2 4 8 12 16 20 24 30	
		Thermal memory (min)	Instantaneous/30	

- Calculate the parameters according to the formula
  The fault current is I; Actual delay time is T
- Formula:
- Example: If Tr=2s is known, and the fault current I=1.5Ir, the actual tripping time T can be calculated from (1.5Ir) 2T=(6Ir) 2×Tr to obtain T=32s.

Short-circuit short-time delay protection

Short-delay fixed-time setting



Associated parameters

- Isd:
  Setting value of short delay action current;
  Knob adjustable gear: (1.5-2-2.5-3-4-5-6-8-10)×Ir。
- Tsd:
  Short delay agreed trip time;
  Knob adjustable gear: 0.1S-0.2S-0.3S-0.4S-X; (X=Close)
- Is:
  Setting value of short delay inverse time action current;
  After the Isd value is set, press the key to set the Is value in the interval of 1.5Ir~Isd. Is~Isd is the interval of inverse time limit, and the inverse time limit is closed when Is=Isd is set.
- ts:
  Short delay and inverse time limit agreed tripping time;
  No need to set ts separately, and its inverse time characteristic is the same as that of long delay, except that the time is one tenth of the delay time of long delay action.

Technical data

Setting value of fixed-time current Isd	Deviation	Line current	Setting value of fixed-time action time Tsd (s)	Time deviation	Intrinsic action time
(1.5~10)Ir	±10%	≤0.90Isd	No action	±10%	40ms
		>1.10Isd	Delay action		
			0.10.20.30.4X, X=Close		
Inverse time current setting value IS		Line current	Inverse time action time t		
Is value can only be adjusted in the range of 1.5Ir~Isd by pressing the key, and Is~Isd is the inverse time interval after the Is value is set.	±10%	≤0.9Is	No action	±10%	40ms
		>1.1Is	Delay action		
			The inverse time delay characteristic is the same as the long delay, except that the time is one tenth of the delay time of the long delay action		

- Calculate the parameters according to the formula
  The fault current is I; Actual delay time is Tsd;
- Fixed time formula: T=tsd;
- Inverse time formula: First calculate the actual delay time T of a certain fault current I time delay according to a long delay formula I2t=(6Ir) 2×tR, and then calculate the actual delay time of a short delay inverse time limit according to a formula ts=T/10.
  Example:
- The known long delay setting value Ir; Short delay inverse time limit setting value Is=Isd=8Ir;
  If that fault current is 6Ir, since 6Ir<Is, the action type is overload long delay, and the fault delay time is T; Now adjust the short delay inverse time limit set value Is=4Ir, Isd=8Ir;
  If the fault current is 6Ir, since 6Ir>Is, the tripping delay time ts=T/10 and the action type is short delay inverse time limit;
  If the fault current is 10Ir, since 10Ir>Isd, the tripping delay time Tsd=tsd, and the action type is short delay time limit.

Short-circuit instantaneous protection

Instantaneous Setting

Associated parameters

■ Ii:

Setting value of short-circuit instantaneous action current;

Knob adjustable gear: (2-3-4-6-8-10-12-15-X)×In, X=Close

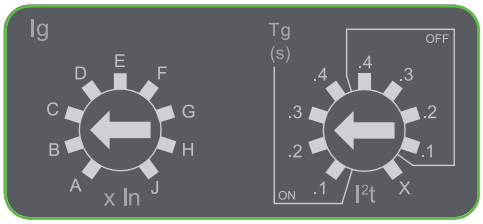
Parameter list

Current setting value Ii	Deviation	Line current	Action Characteristic
(2-3-4-6-8-10-12-15) In+off	±15%	≤0.85Ii	No action
		>1.15Ii	Instantaneous Action

Operating Instructions

Ground fault protection

Ground fault protection Setting



Relevant parameters

■ Ig:

Setting value of grounding protection action current;

Knob adjustable gear: (A-B-C-D-E-F-G-H-J)×In。

Rated current In	A	B	C	D	E	F	G	H	J	Remarks
In≤400A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	xIn
400A<In≤1200A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	xIn
In>1200A	500A	640A	720A	800A	880A	960A	1040A	1120A	1200A	

■ Tg:

Set value of ground fault protection delay time;

Adjustable gear of knob (fixed time limit, inverse time limit): 0.1S-0.2S-0.3S-0.4S-X, X=Close

Type	Deviation	Line current	Action time (s)	Time deviation
Definite Time Limit	±10%	< 0.9Ig	No action	±10% or ±40 ms (inherent absolute deviation), whichever is the maximum
		≥1.1Ig	0.10.2, 0.3, 0.4	
Definite Time Limit		< 0.9Ig	No action	
		≥1.1Ig and (I<In or 1200A)	or	
		≥1In or 1200A	The action time is in accordance with the fixed time limit.	

There are two types of ground fault protection:

Type	Description
Difference (T)	Detect zero sequence current, i. e. vector sum of phase current and neutral current (3P, 4P and 3P+N according to equipment type)
Ground Current Type (W)	The current on the grounding cable is directly detected by means of a WEC transformer, with a maximum distance of 10 meters between the transformer and the circuit breaker

Ex9A
Air circuit breaker

ACCESSORY

D
01-03

Ex9A
Air circuit breaker

ACCESSORY

D

Overview of accessories

Ex9A series air circuit breaker and Ex9ASD series disconnector have abundant accessories, which are divided into standard configuration and optional accessories, which meet different requirements of users in the most economical way. Details of accessories are shown in the table below

Connection

- Rear connection (horizontal or vertical)
- DC connection plate
- Phase Barrier

Lock

- Lock in the “disconnection” position with a padlock
- Baffle lock
- Lock in OFF position with key lock
- Button can be locked by transparent cover of padlock
- Door interlock-the circuit breaker in the connected position prohibits the opening of the cabinet door

Indication contact

- Standard or small capacity auxiliary contacts (AX)
- ON/OFF Indicators
- Fault trip indication
- Position signal indication-connection, test, disconnection position
- Programmable relay signal contacts
- Relay Module (M6C)

Remote operation

- Remote tripping function
- Under-voltage Release (UVT/UVTR)
- Standard Instantaneous
- Non-adjustable time delay
- Or 2nd shunt trip (SHT02)
- Remote ON/OFF
- Shunt Trip (SHT)
- Closing electromagnet (XF)
- Energy storage motor (MD)
- Communication Function (COM)

Accessories

- DOOR FRAME
- Mechanical interlock (MIT/IPA)

Accessory Configuration

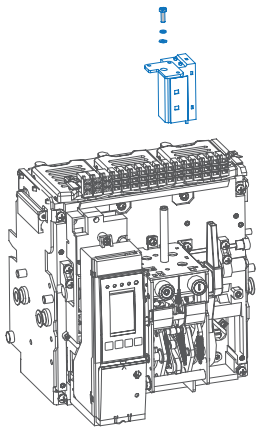
	Ex9A Series DC Circuit Breaker Accessories	Ex9ASD Series DC Disconnector Accessories
Standard accessories	■ Shunt Trip (SHT) ■ Closing electromagnet (XF) ■ Energy storage motor (MD) ■ Opening and closing indication ■ Indication of stored energy ■ 4 groups of conversions (AX) ■ Drawer-type door frame (DDP) ■ Fixed-type door frame (CDP)	■ Shunt Trip (SHT) ■ Closing electromagnet (XF) ■ Energy storage motor (MD) ■ Opening and closing indication ■ Indication of stored energy ■ 4 groups of conversions (AX) ■ Withdrawable door frame (DDP) ■ Fixed-type door frame (CDP) ■ Fixed-type phase barrier (PHS) ■ Drawer-type phase barrier (DPS)
Optional Accessories	■ Second shunt trip (SHT02) ■ Under-voltage instantaneous release (UVT)/Under-voltage delay release (UVTR) ■ 6NO 6NC auxiliary contacts (AX) (or other optional) ■ Key lock: Opening position lock (KLK) ■ Door Interlock (VPEC) ■ Fixed-type phase barrier (PHS) ■ Drawer-type phase barrier (DPS) ■ Button locking device (VBP) ■ Mechanical interlock: Wire rope (IPA) ■ Drawer-type position signal indicating device (EF) ■ Mechanical counter (CDM) ■ DC connection plate (JPR)	■ Second shunt trip (SHT02) ■ Under-voltage instantaneous release (UVT)/Under-voltage delay release (UVTR) ■ 6NO 6NC auxiliary contacts (AX) (or other optional) ■ Key lock: Opening position lock (KLK), two sets, two locks and one key, three sets, three locks and two keys ■ Door Interlock (VPEC) ■ Button locking device (VBP) ■ Mechanical interlock: Wire rope (IPA) ■ Drawer-type position signal indicating device (EF) ■ DC connection plate (JPR)

Description of Accessories

Shunt Trip (SHT)

Optional second shunt trip (SHT02)

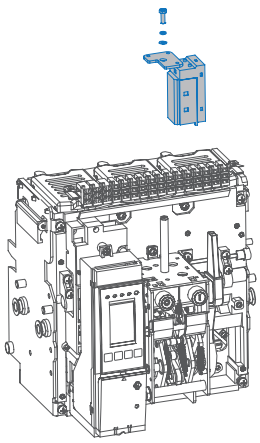
- The shunt trip is used to disconnect the circuit breaker by remote control, and when the circuit breaker is closed, the circuit breaker can be opened at any time.
- The shunt trip device has both AC control and DC control, and when the power supply voltage is equal to any voltage value between 70% and 110% of the rated control power supply voltage, the shunt trip can reliably break the circuit breaker. The shunt trip belongs to the pulse powered working mode, and the pulse time shall not be less than 200ms. If the shunt trip needs to be connected in series with the main body, please consult with manufacturer.



Characteristic		
Optional input power (Us)		AC230V
		AC400V
		DC220V
		DC110V
		DC24V
		DC48V
Operating conditions		70%~110%Us
Impact power (Ps) Impact time~100ms	DC	200W
	AC	200VA
Operating power (Pc)	DC	5 W
	AC	5 VA
Opening Time		(max) 30 ms
Insulation voltage		2000 V 50Hz (1 minute)

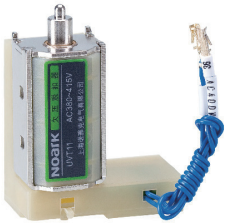
Closing electromagnet (XF)

- The closing electromagnet is used to close the circuit breaker by remote control, and when the circuit breaker is in the off and energy storage state at the same time, the circuit breaker can be closed at any time. The closing electromagnet device has both AC control and DC control, and when the power supply voltage is equal to any voltage value between 85% and 110% of the rated control power supply voltage, the closing electromagnet can reliably close the circuit breaker. The closing electromagnet belongs to the pulse powered working mode, and the pulse time shall not be less than 200ms. If the closing electromagnet needs to be connected with the main body in series, please consult with manufacturer.



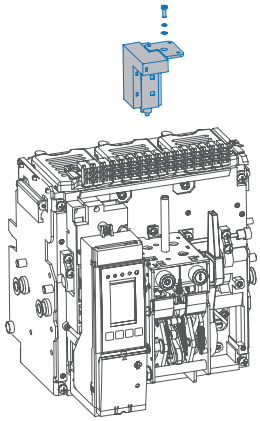
Characteristic		
Optional input power (Us)		AC230V
		AC400V
		DC220V
		DC110V
		DC24V
		DC48V
Operating conditions		85%~110%Us
Impact power (Ps) Impact time~100ms	DC	200W
	AC	200VA 300VA
Operating power (Pc)	DC	5 W
	AC	5 VA
Closing Time		(max) 30 ms
Insulation voltage		2000 V 50Hz (1 minute)

Description of accessories



Under-voltage instantaneous release (UVT)/Under-voltage delay release (UVTR)

- Under-voltage release breaks the circuit breaker in case of obvious system step-down or power failure, ensuring that the load or electrical equipment below the circuit breaker is not damaged by under voltage. It can be used as a remote control device (using a NC button) to open or monitor the circuit voltage of the primary and secondary sides of the system.
- The control power supply for the under-voltage release can be from the primary side of the circuit breaker or from a separate power supply; At the same time, the circuit breaker is closed only when the control power supply is applied to the under-voltage release device (mechanical locking closure). The unit can be operated with AC control power.
- When the under-voltage release voltage drops to 35%~70% of the supply voltage Us, the under-voltage release will operate; When the voltage of the under-voltage release reaches 85%~110% of the supply voltage Us, the under-voltage release ensures that the circuit breaker can be closed; When the under-voltage release voltage is less than 35% of the supply voltage Us, the under-voltage release will prevent the circuit breaker from closing.
- There are two action modes of under-voltage release, one is instantaneous action and the other is delay action. The under-voltage release with delayed action shall adjust its tripping time according to a certain set time, so as to prevent the circuit breaker from opening due to short-time voltage drop or power failure of the system. The delay tripping time can be adjusted by 0.5s, 1s, 3s and 5s. In 1/2 delay time, the circuit breaker will not open when the power supply voltage returns to 85%Us and above.



Characteristic		
Optional input power (Us)		AC230V
		AC400V
		DC220V
		DC110V
		DC24V
		DC48V
Delay Action Time		0.5s, 1s, 3s, 5s
Delay action deviation		±20%
Impact power (Ps) Impact time~100ms	DC	200W
	AC	200VA
Operating power (Pc)	DC	5 W
	AC	5 VA
Operating conditions		≤30% Us fails to close 35%~70% Us under-voltage opening action 85%~110%Us can be closed normally
Insulation voltage		2000 V 50Hz (1 minute)

Under-voltage delay module (UVDM)

- UVDM displays and monitors whether the voltage is normal by detecting the three-phase voltage. In case of abnormal conditions such as under-voltage and voltage loss, the control module automatically controls the under-voltage coil to operate according to the set action time, so as to effectively protect the equipment at the load end from under voltage.
- Characteristic:
  (1) External panel or baseplate installation
  (2) Delay 0~10s adjustable
  (3) Three-phase voltage input
  (4) With voltage measurement display

Description of Accessories

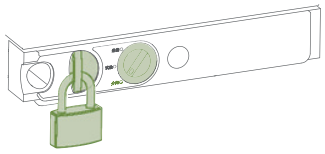
Energy storage motor (MD)

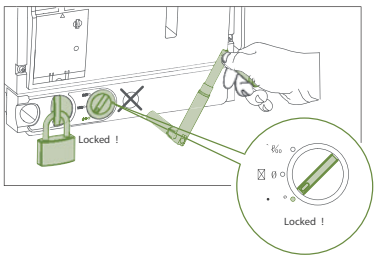
- The energy storage motor can automatically store energy for the energy storage spring of the operating mechanism; When closing the circuit breaker, the energy storage motor immediately stores the energy of the closing spring, and a microswitch is installed in the energy storage motor to monitor whether the energy storage spring stores energy or not.
- The energy storage spring can also be used for manual energy storage during maintenance or in case of no control power supply (use the energy storage handle of the operating mechanism).

Characteristic		
Optional input power (Us)		AC230V
		AC400V
		DC220V
		DC110V
		DC48V
		DC24V
Operating conditions		85%~110%Us
Number of operations		≤1 time (3 minutes)
Impact power (Ps) Impact time~100ms	AC	400 VA
	DC	350 W
Operating power (Pc)	AC	150 VA
	DC	150 W
Energy storage time		3 ~ 4s
Insulation voltage		2000 V 50Hz (1 minute)

Locking in the disconnection position (withdrawn state)

- Use the padlock to control and lock the drawer seat in the disconnection position, while the padlock (φ4mm can be used) is not supplied, but provided by the user. Only drawer-type circuit breakers have such a locking device, which is installed on its movable part.





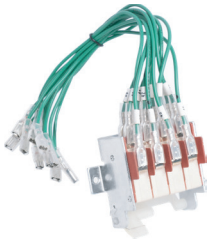
Mechanical interlock

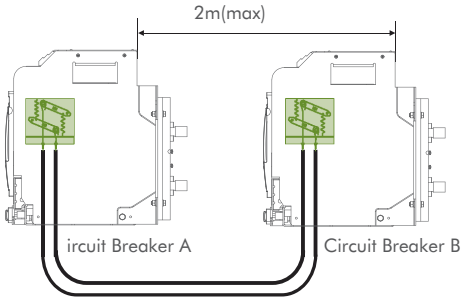
- Mechanical interlocks are divided into two types: Flexible wire rope interlocking (IPA).

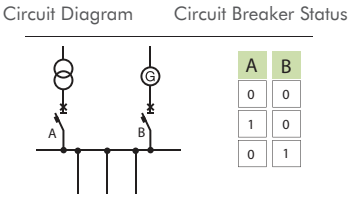
Wire rope interlocking

- Mechanical interlocking between 2 circuit breakers
- Mechanical interlocking between 3 circuit breakers
- Connection with flexible steel cable
- Interlocked circuit breakers up to a distance of 2 m

Description of accessories







Auxiliary Contact

- The auxiliary contact is installed on the circuit breaker, which is linked with the opening and closing of the operating mechanism of the circuit breaker. The auxiliary contact can be used for monitoring the opening and closing state of the circuit breaker and realizing the control or interlocking of relevant electrical appliances through the connection of the control circuit, and outputting signals of signal lights and relays.
- Standard configuration: 4 groups of changeover contacts
- Optional configuration: Conversion type: □6 groups of conversions
  Opening-closing type: □4NO 4NC □6NO 6NC

Characteristic		
Model of auxiliary contact		4 groups switching/4NO 4NC 6 groups switching/6NO 6NC
Conventional heating current		5A
Breaking Capacity	AC-15	5A/AC110V
		4A/AC240V
		2A/AC415V
	DC-13	0.25A/DC110V
		0.25A/DC220V

DC connection plate

- Current: (one of four)

□JPR12 630-800A □JPR12 1000-1250A □JPR12 1600-2000A
□JPR12 2500A □JPR13 1250-1600A □JPR13 2000-2500A
□JPR13 3200 □JPR13 4000

- Quantity: (one of three)

□1 □2 □3(Select 1 for type B wiring, 2 for type A/C wiring, and 3 for type D wiring)

Description of Accessories

Relay Signal Module (M6C)

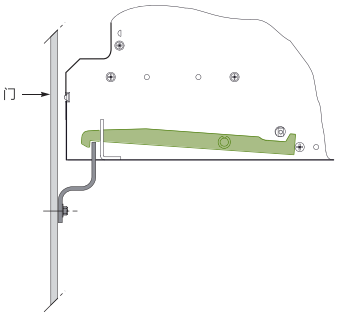
- M6C relay signal module supplies power to DC24V, which is used to amplify the DO/DI control signal sent by the controller, and DC24V is provided by the AD power supply module.

Power Supply Module (AD)

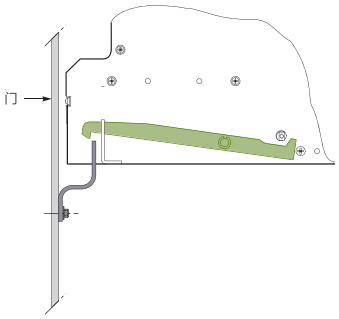
- AD power module can provide DC 24V power supply with power no less than 9.6W, output four groups of DC 24V wiring terminals, and select AC or DC input: AC Input: AC 380V AC220V; DC Input: DC220V DC110V.

Door Interlock (VPEC)

- A door interlock is installed on the right side of the drawer base to prevent the circuit breaker from opening the cabinet door when in the “connected” or “test” position. If the door is open and the circuit breaker body is in the “connected” position, the door can be closed without disconnecting the circuit breaker.



Circuit breaker door does not open in “connected” or “test” position

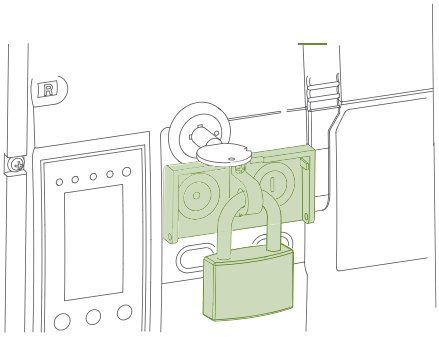


The door can be opened when the circuit breaker is in the “Exit” position

Description of accessories

Button locking device (VBP)

- The function of the button position lock is to lock the button of the circuit breaker with the button baffle plate to prevent the misoperation of the “opening” and “closing” buttons of the circuit breaker and ensure the reliable operation of the circuit breaker, and a padlock can be configured to lock the button baffle plate. The transparent cover of the button can be provided by the manufacturer, and the padlock (φ4mm can be used) is not provided, but provided by the user.



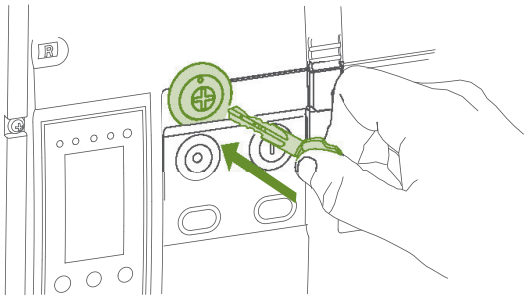
Opening position lock (KLK)

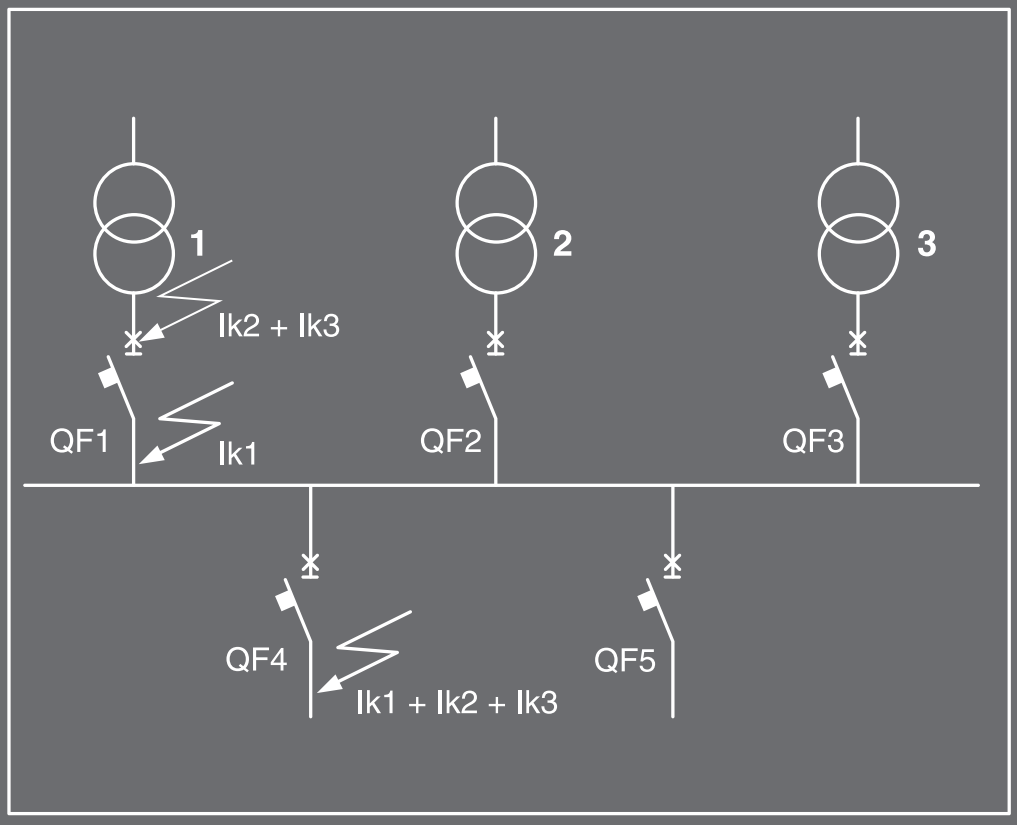
- The function of the opening position lock is used to lock the circuit breaker at the opening position to ensure that the circuit breaker cannot be closed.
- Key locks are special round locks, and there are 3 different configurations:

  One circuit breaker with one lock and one key;

  Two circuit breakers with two locks and one key;

  Three circuit breakers with three locks and two keys.




1
2
3
Ik2 + Ik3
QF1
Ik1
QF2
QF3
QF4
QF5
Ik1 + Ik2 + Ik3

Ex9A
Air circuit breaker

APPLICATION OF CIRCUIT BREAKER

E

Influence of Temperature on the Capacity of Circuit Breaker

Different ambient temperatures have a certain impact on the use of the circuit breaker, but it can be used with proper reduced capacity. The following table shows the continuous current carrying capacity of the circuit breaker and busbar under each wiring mode corresponding to the ambient temperature and meeting the agreed heating conditions.

Ex9A25 temperature derating table

Ambient Temperature	Ex9A25DC -630	Ex9A25DC -800	Ex9A25DC -1000	Ex9A25DC -1250	Ex9A25DC -1600	Ex9A25DC -2000	Ex9A25DC -2500
-40℃ ~40℃	630	800	1000	1250	1600	2000	2500
45℃	630	800	1000	1250	1600	2000	2500
50℃	630	800	1000	1250	1600	2000	2400
55℃	630	800	1000	1200	1500	1900	2350
60℃	630	800	950	1150	1400	1750	2250

Ex9A40 temperature derating table

Ambient Temperature	Ex9A40DC -1600	Ex9A40DC -2000	Ex9A40DC -2500	Ex9A40DC -3200	Ex9A40DC -4000
-40℃ ~45℃	1600	2000	2500	3200	4000
50℃	1600	2000	2500	3200	3900
55℃	1600	2000	2500	3100	3800
60℃	1600	2000	2400	3000	3700

Influence of Temperature on the Capacity of Circuit Breaker

Capacity reduction at different altitudes

There is a certain influence on the use of circuit breaker under different altitude, but it can be used with proper reduced capacity. The performance of Ex9A series circuit breaker will not change at the altitude below 2000m. When the altitude exceeds 2000m, the composition, insulation, cooling and pressure in the atmosphere will change and the circuit breaker will be reduced in capacity. These changes are reflected in the following important parameters.

Ex9A25DC~40DC Altitude derating Table

Altitude (m)	Insulation withstand voltage (V)	Insulation voltage (V)	Rated Working Voltage (V)	Rated working current (V)
2000	3500	1000	690	1xIn
3000	3000	800	580	0.96xIn
4000	2500	700	500	0.91xIn
5000	2000	600	400	0.87xIn

Altitude capacity reduction of Ex9ASD DC disconnector
The capacity shall not be reduced if the altitude is less than 5000M, please consult with manufacturer for use above the altitude of 5000M.

Power Loss

Power loss is the total loss measured at the rated current of the circuit breaker.

Power Loss	Rated current (A)	Drawer-type (W)	Fixed-type (W)
Ex9A25DC	630	178	104
	800	190	113
	1000	237	124
	1250	293	161
	1600	435	232
	2000	500	266
	2500	560	300
Ex9A40DC	1600	390	170
	2000	390	170
	2500	470	250
	3200	600	260
	4000	670	420

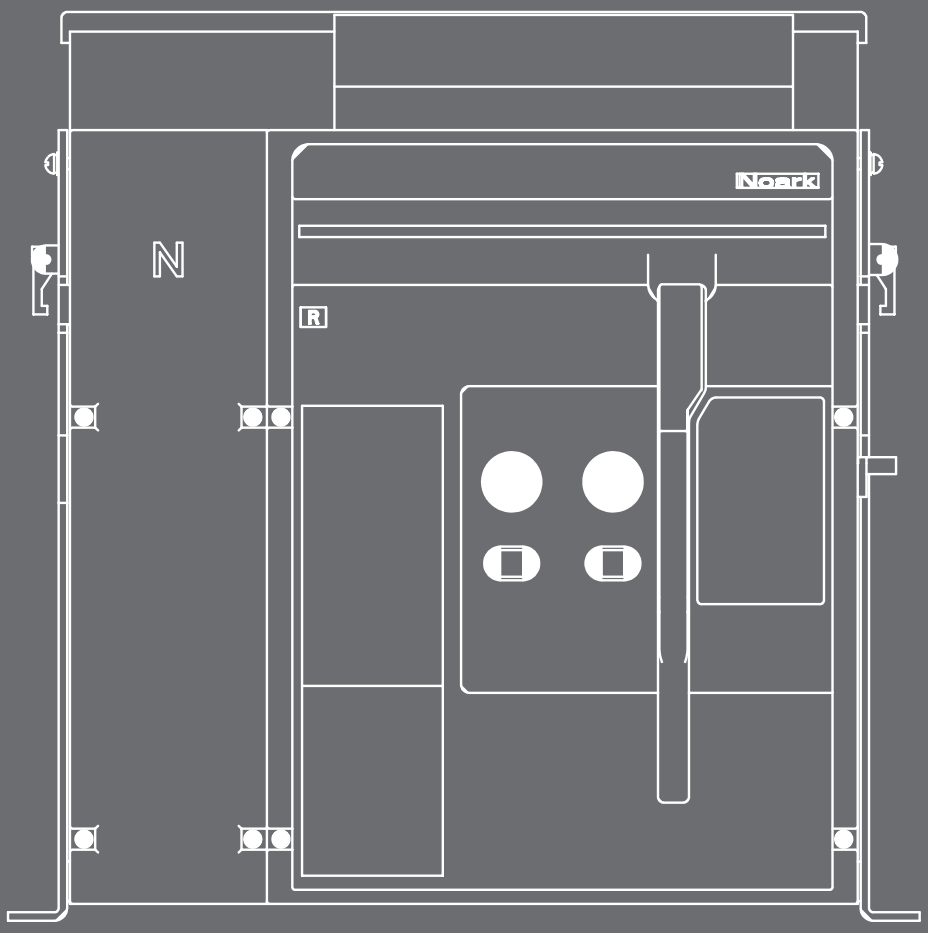
Note

The data in the above technical data are calculated from experiments and theories, which can only be used as general guidance for model selection; It is not a substitute for industrial practical experience and validation experiments.

Ex9A
Air circuit breaker

SIZE AND INSTALLATION

F
01-03



Ex9A
Air circuit breaker

SIZE AND INSTALLATION

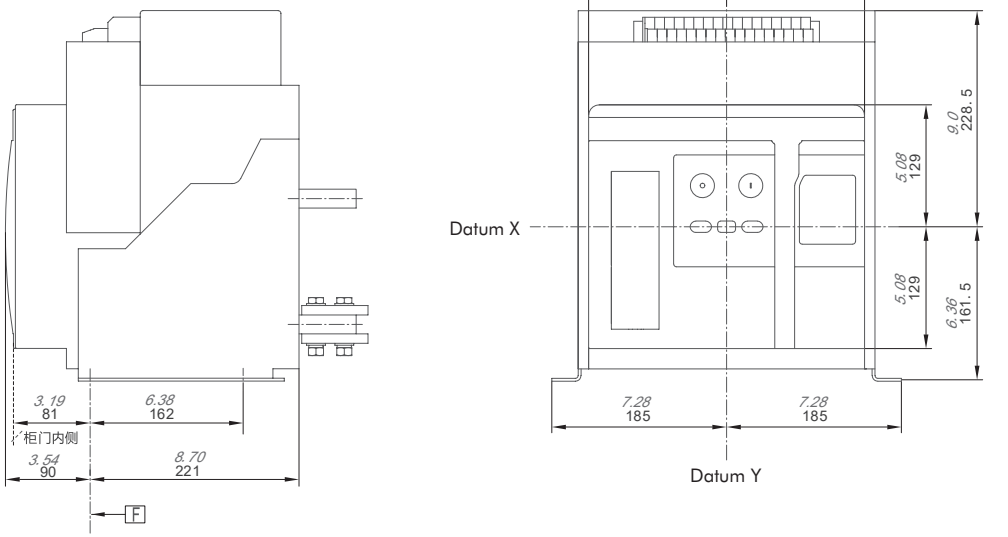
F

Size of Circuit Breaker

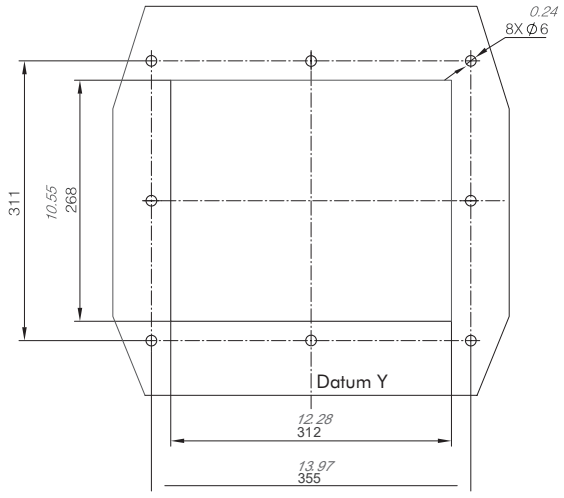
Ex9A25DC/Ex9ASD-2500DC
Fixed-type (type A and B wiring mode)

Overall Dimensions

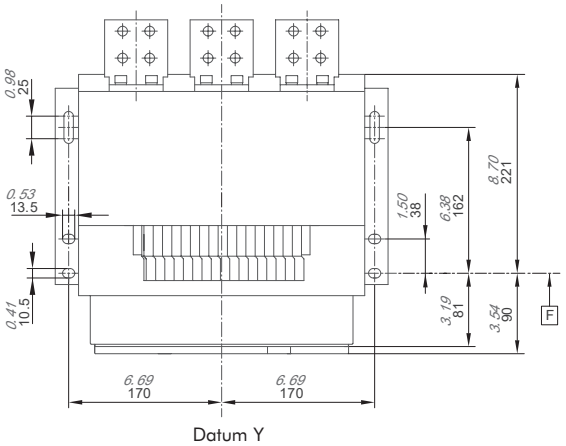
in.
mm



Installation Dimensions



Panel Perforating Size



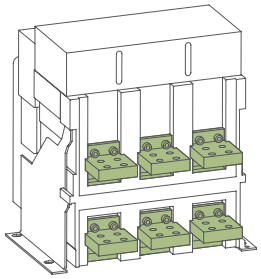
Fixed Horizontal Position (on base plate or rail)

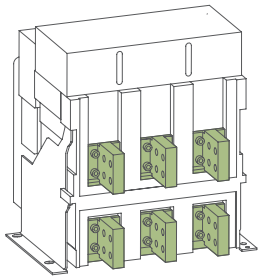
Size of Circuit Breaker

Ex9A25DC/Ex9ASD-2500D
Fixed-type (type A and B wiring mode)

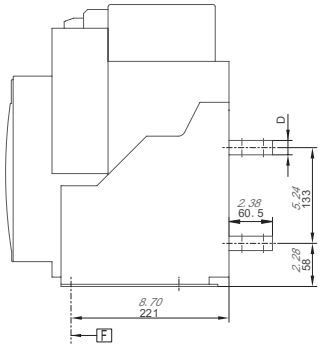
Installation dimension of busbar without DC connection plate

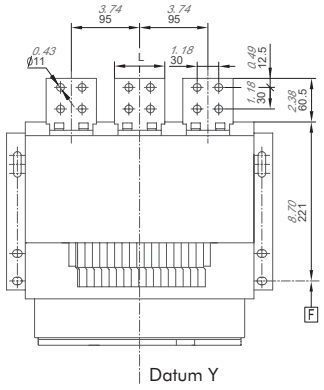
in.
mm



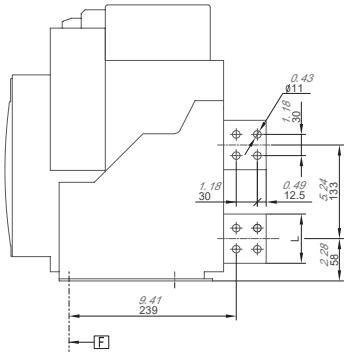


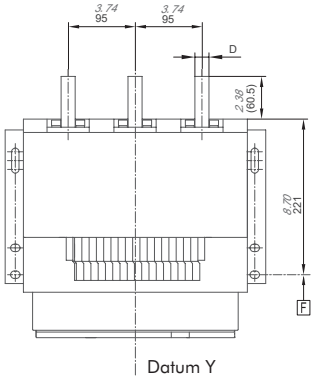
Horizontal Connection





Vertical Connection





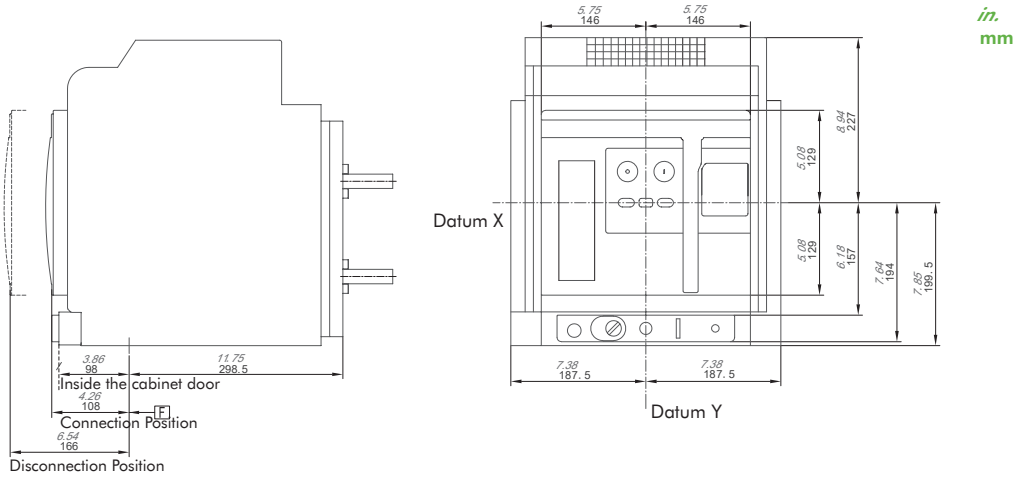
Rated Current	Dimension D	Dimension L
630A~1600A	15mm	60mm
2000A~2500A	20mm	70mm

Size of Circuit Breaker

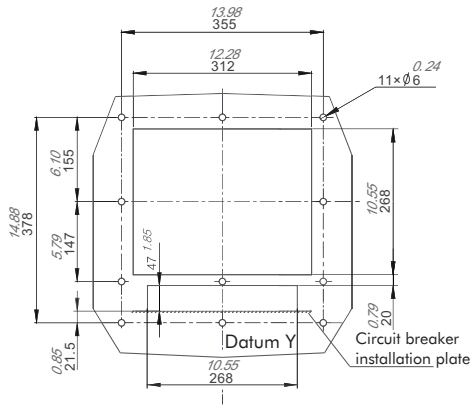
Ex9A25DC/Ex9ASD-2500DC
Drawer-type (type A and B wiring mode)

Overall Dimensions

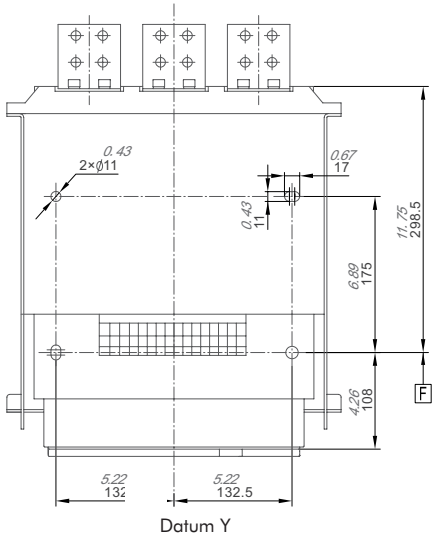
in.
mm



Installation Dimensions



Panel Perforating Size



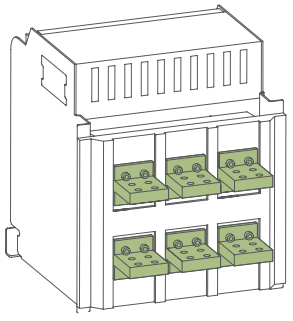
Fixed Horizontal Position (on base plate or rail)

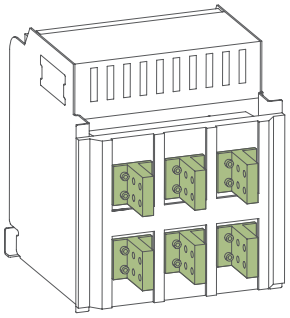
Size of Circuit Breaker

Ex9A25DC/Ex9ASD-2500DC
Drawer-type (type A and B wiring mode)

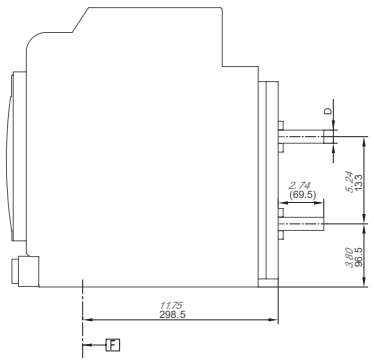
Installation dimension of busbar without DC connection plate

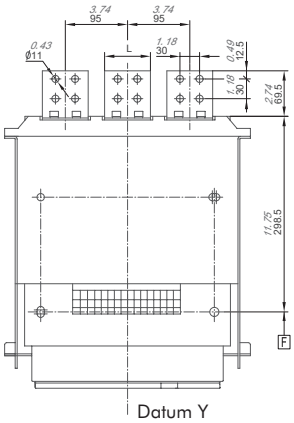
in.
mm



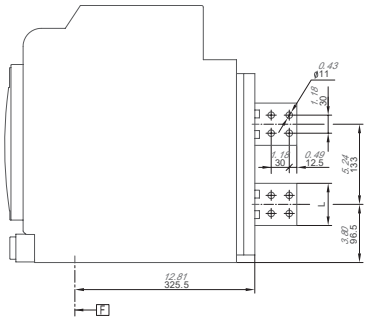


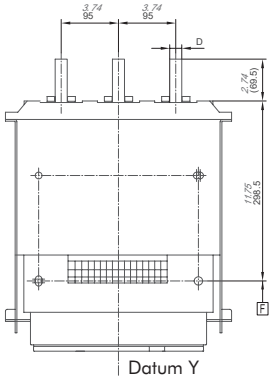
Horizontal Connection





Vertical Connection





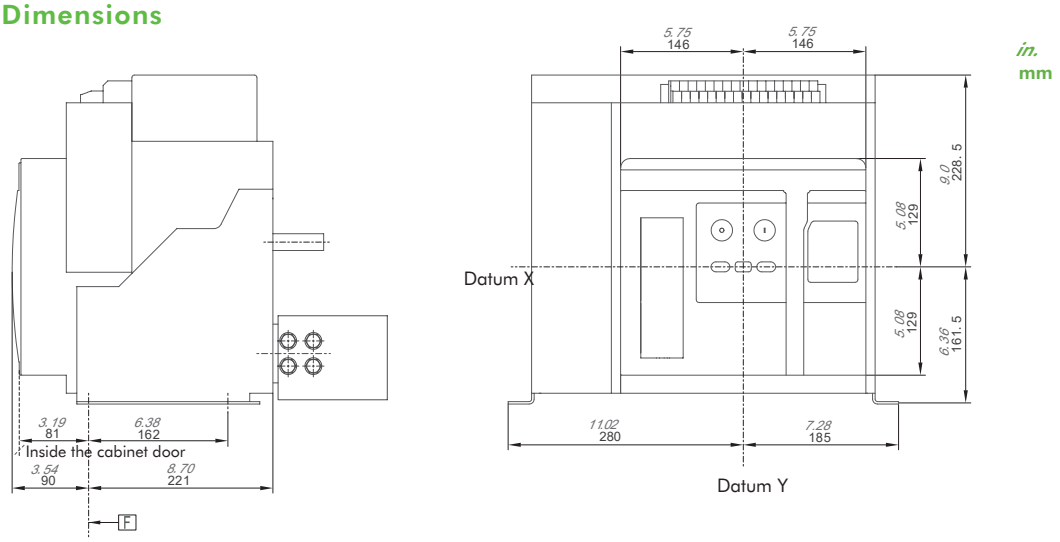
Rated Current	Dimension D	Dimension L
630A~1600A	15mm	60mm
2000A~2500A	20mm	70mm

Size of Circuit Breaker

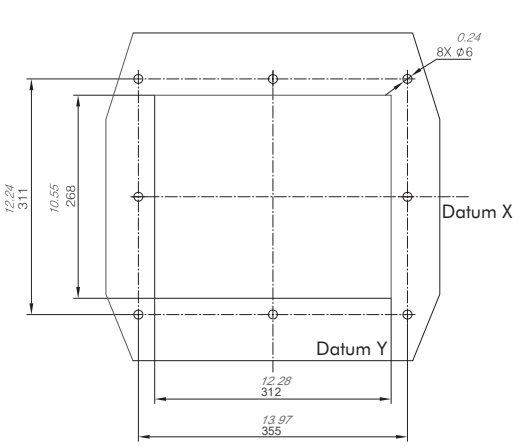
Ex9A25DC/Ex9ASD-2500DC
Fixed-type (type C and D wiring mode)

Overall Dimensions

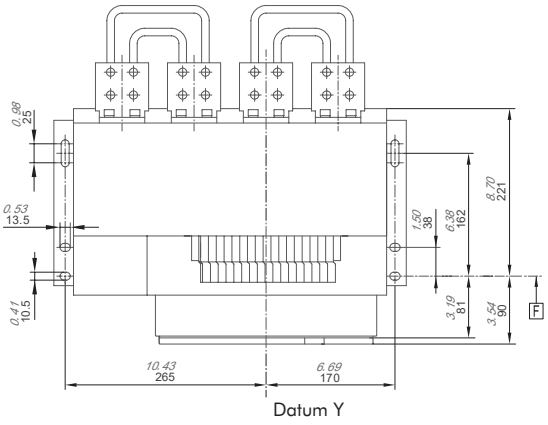
in.
mm



Installation Dimensions



Panel Perforating Size



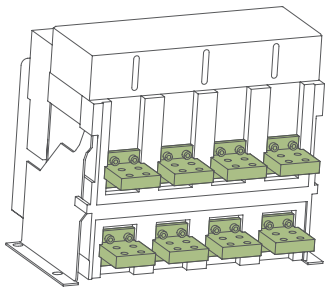
Fixed Horizontal Position (on base plate or rail)

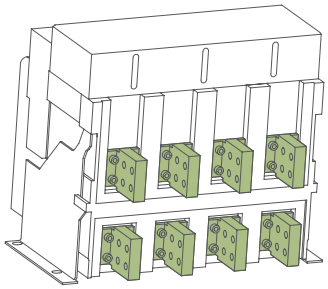
Size of Circuit Breaker

Ex9A25DC/Ex9ASD-2500DC
Fixed-type (type C and D wiring mode)

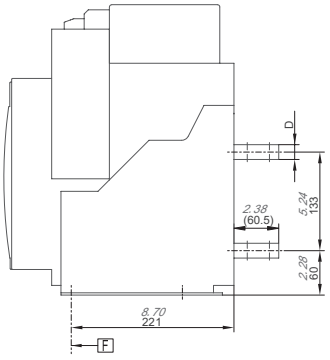
Installation dimension of busbar without DC connection plate

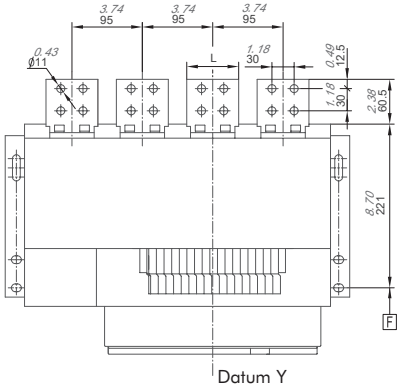
in.
mm



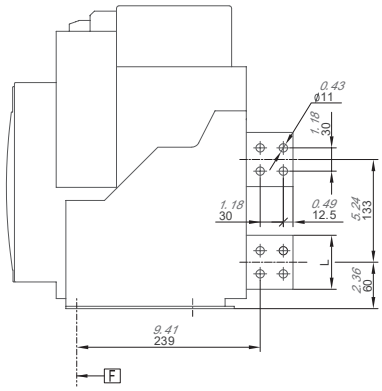


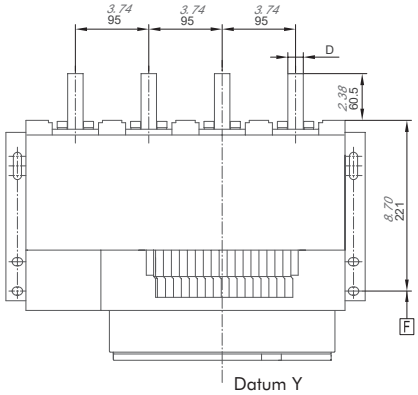
Horizontal Connection





Vertical Connection



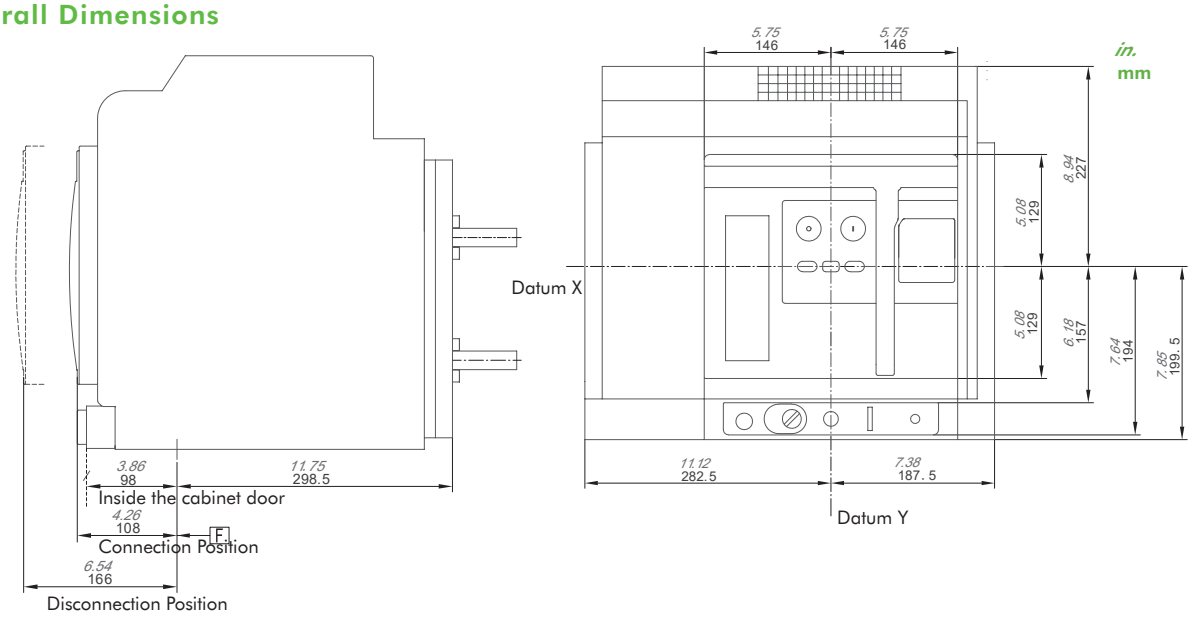


Rated Current	Dimension D	Dimension L
630A~1600A	15mm	60mm
2000A~2500A	20mm	70mm

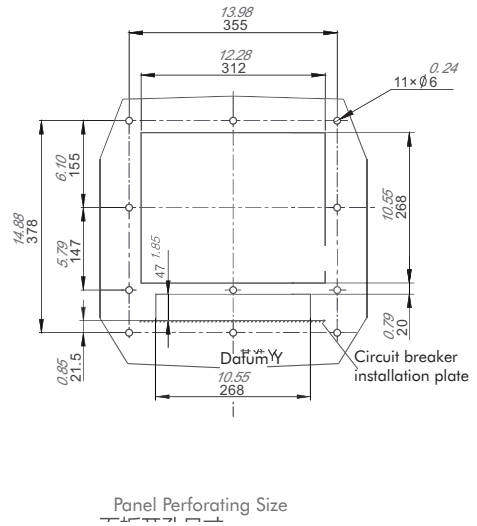
Size of Circuit Breaker

Ex9A25DC/Ex9ASD-2500DC
Drawer-type (type C and D wiring mode)

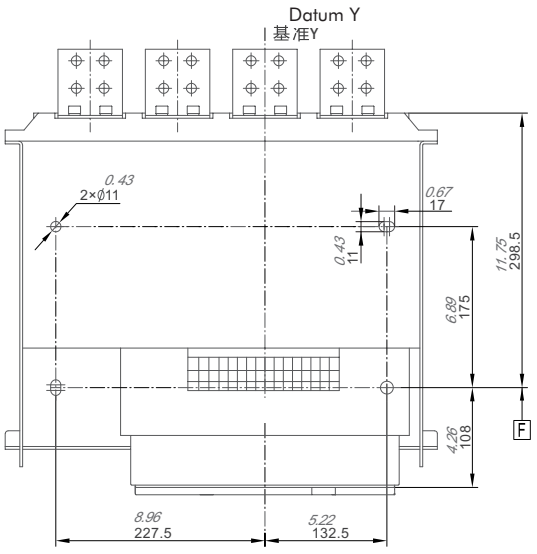
Overall Dimensions



Installation Dimensions



Panel Perforating Size



Fixed Horizontal Position (on base plate or rail)

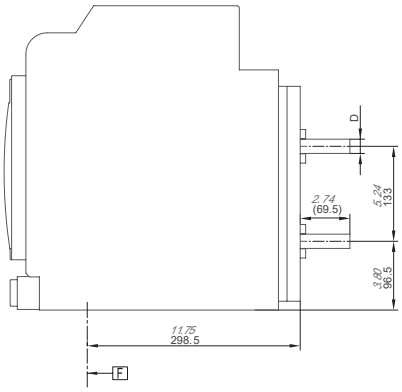
Size of Circuit Breaker

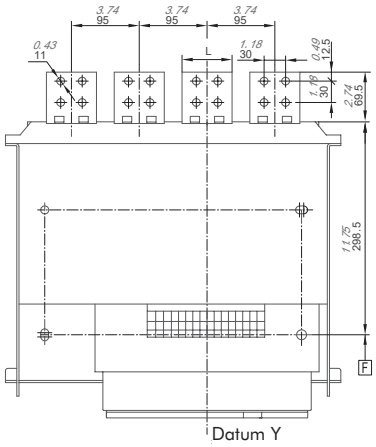
Ex9A25DC/Ex9ASD-2500DC
Drawer-type (type C and D wiring mode)

Installation dimension of busbar without DC connection plate

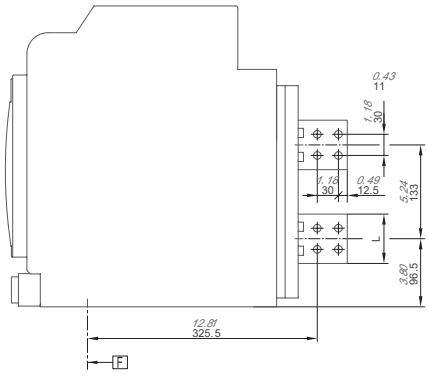
in.
mm

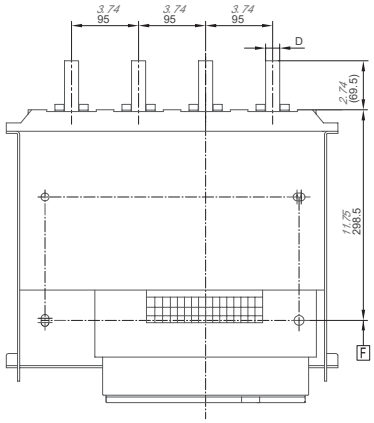
Horizontal Connection





Vertical Connection





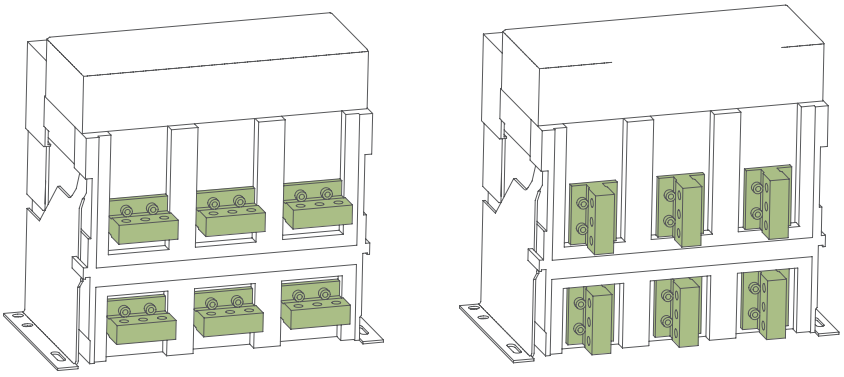
Rated Current	Dimension D	Dimension L
630A~1600A	15mm	60mm
2000A~2500A	20mm	70mm

Size of Circuit Breaker

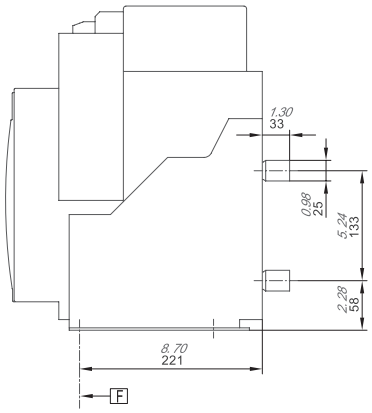
Ex9A40DC/Ex9ASD-4000DC
Fixed-type (type A and B wiring mode)

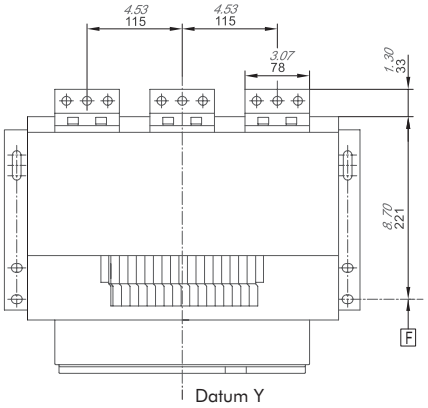
Installation dimension of busbar horizontal connection without DC connection plate
1600A~2500A

in.
mm

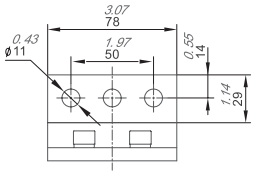


Horizontal Connection

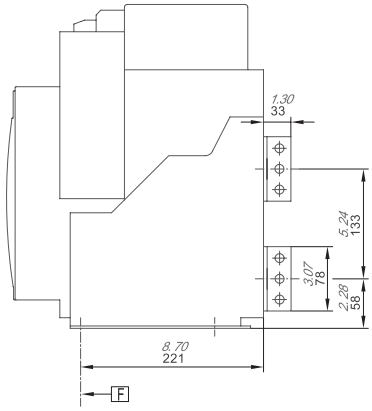


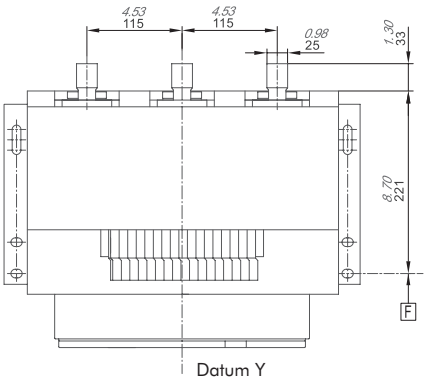


Dimension drawing of wiring terminals

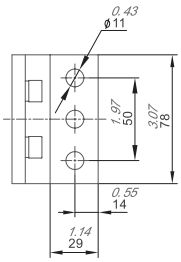


Vertical Connection





Dimension drawing of wiring terminals

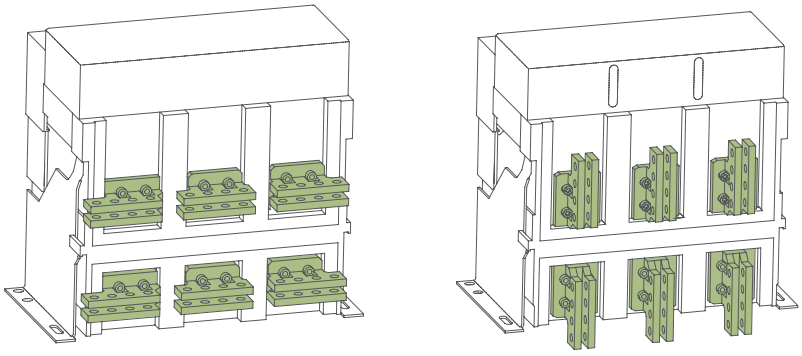


Size of Circuit Breaker

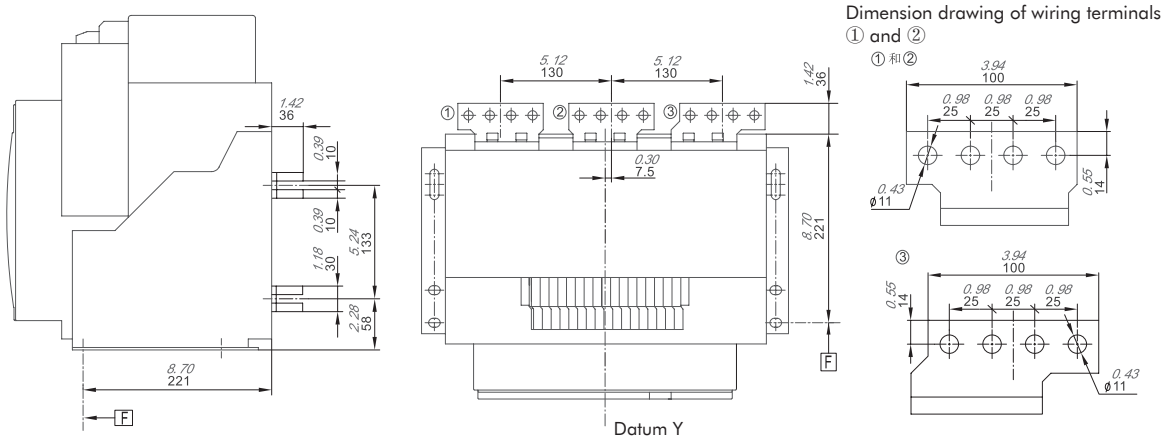
Ex9A40DC/Ex9ASD-4000DC
Fixed-type (type A and B wiring mode)

Installation dimension of busbar horizontal connection without DC connection plate 3200A~4000A

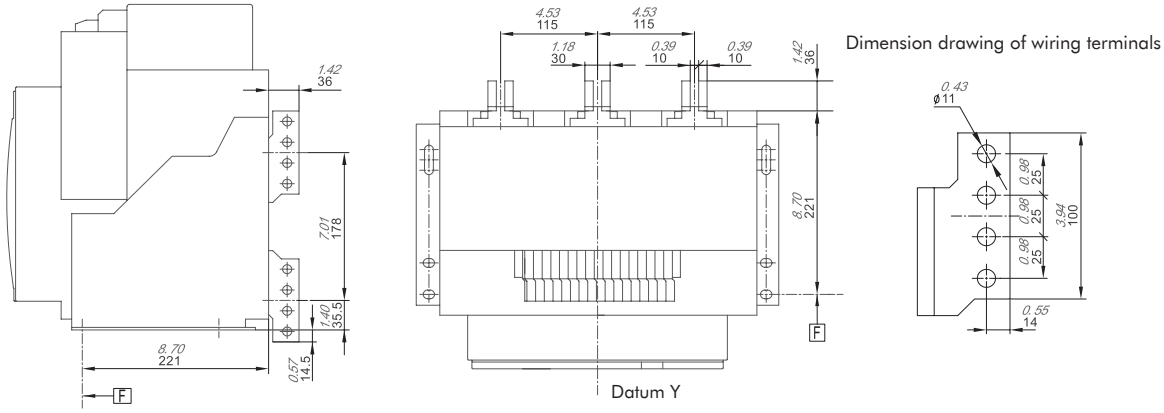
in.
mm



Horizontal Connection



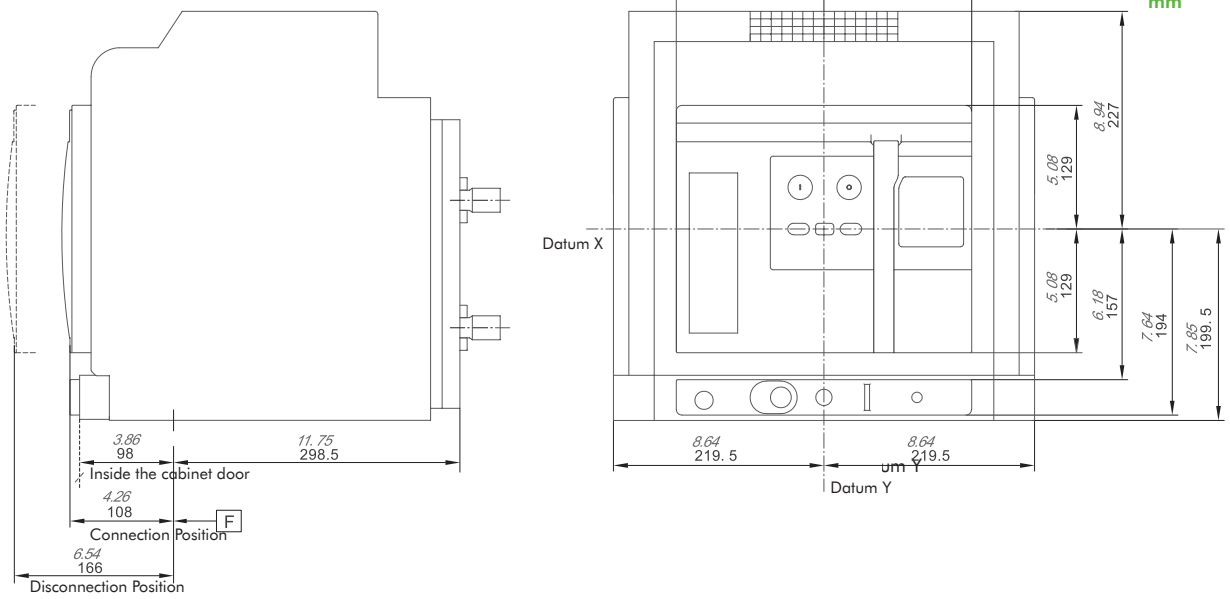
Vertical Connection



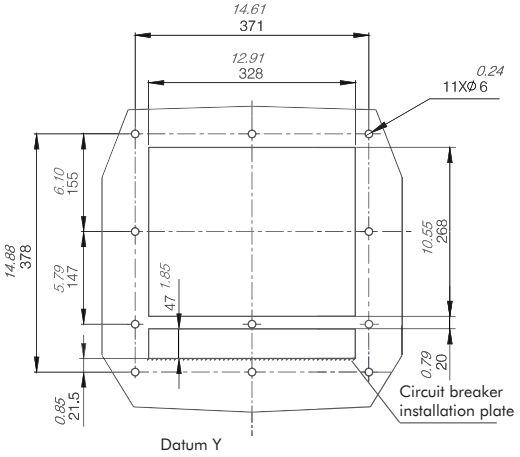
Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type A and B wiring mode)

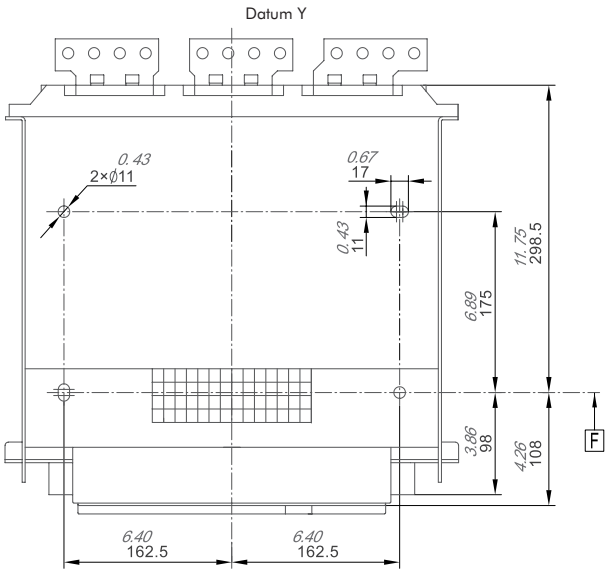
Overall Dimensions



Installation Dimensions



Panel Perforating Size



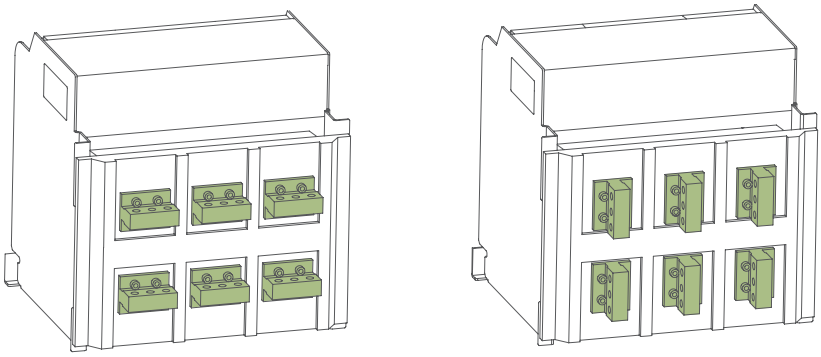
Fixed Horizontal Position (on base plate or rail)

Size of Circuit Breaker

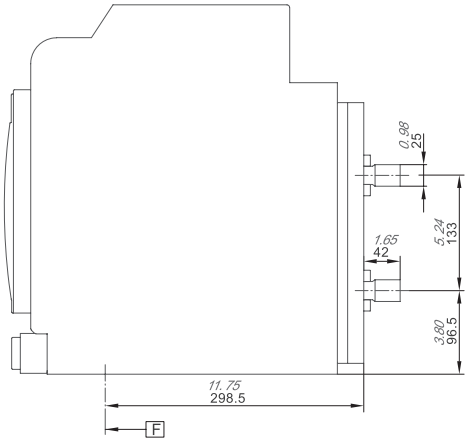
Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type A and B wiring mode)

Installation dimension of busbar horizontal connection without DC connection plate 1600~2500A

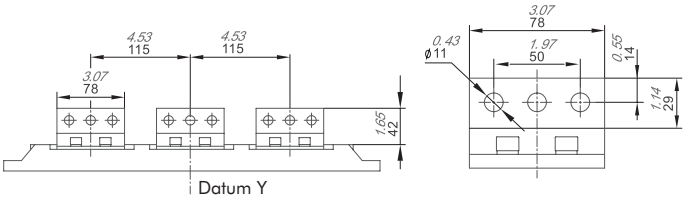
in.
mm



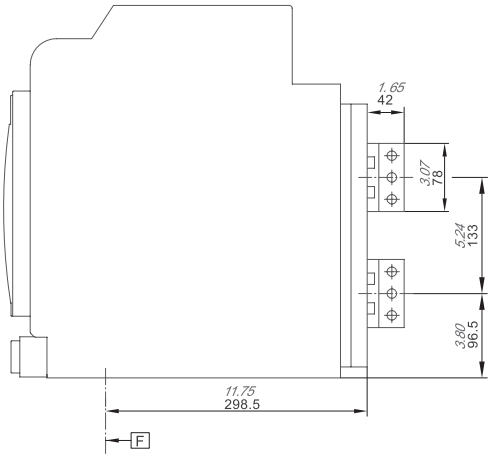
Horizontal Connection



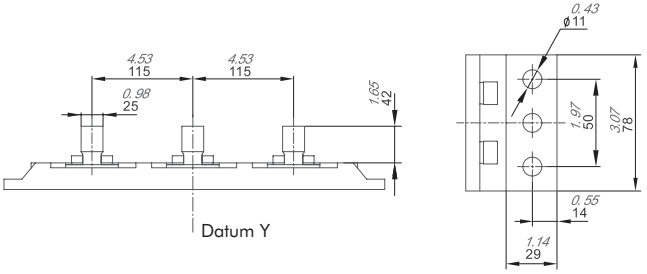
Dimension drawing of wiring terminals



Vertical Connection



Dimension drawing of wiring terminals

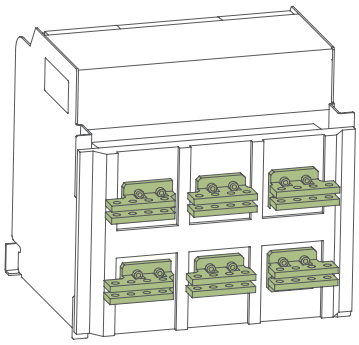


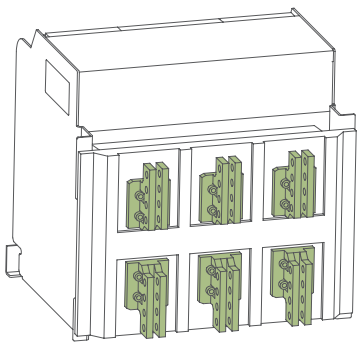
Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type A and B wiring mode)

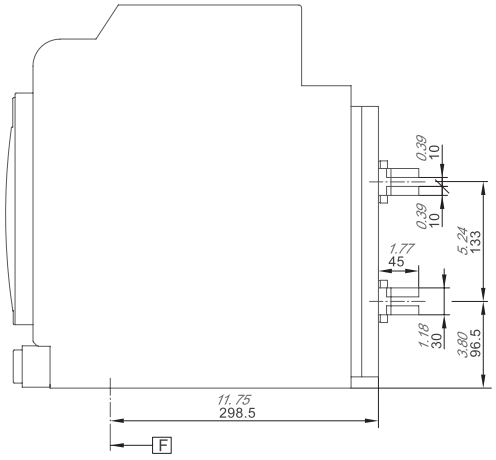
Installation dimension of busbar vertical connection without DC connection plate 3200~4000A

in.
mm

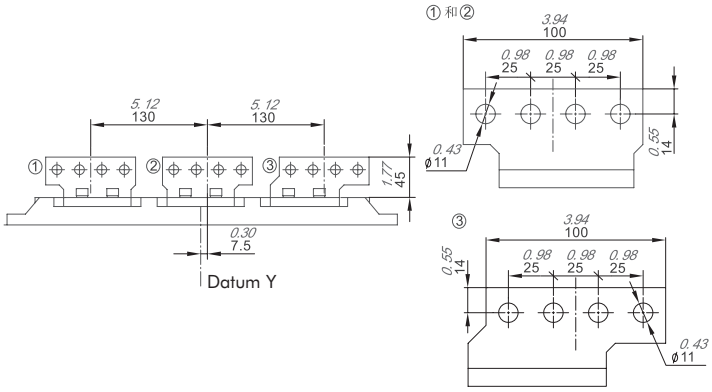




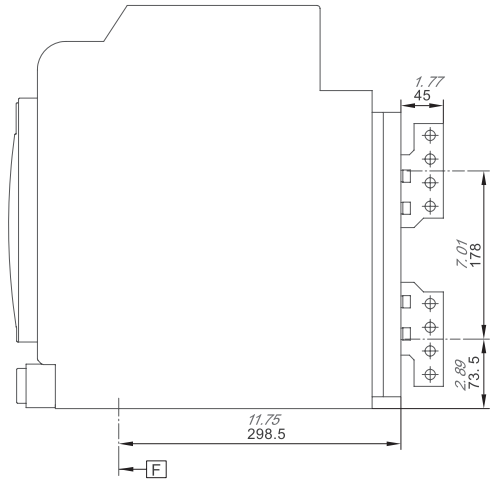
Horizontal Connection



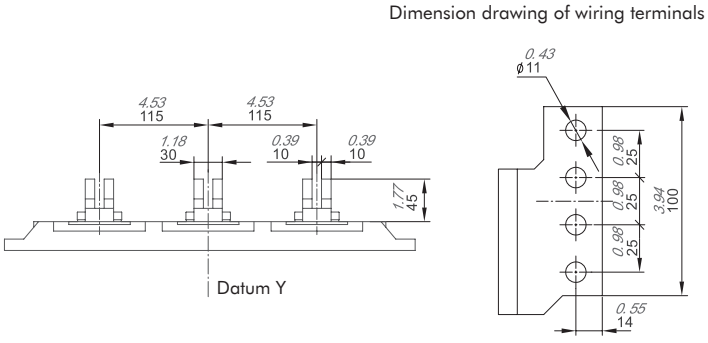
Dimension drawing of wiring terminals



Vertical Connection



Dimension drawing of wiring terminals

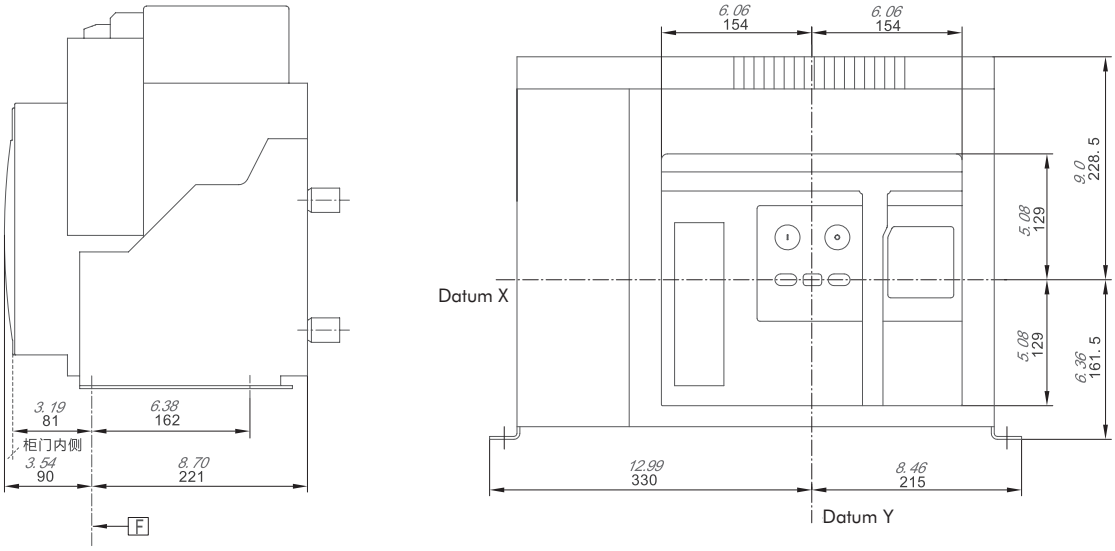


Size of Circuit Breaker

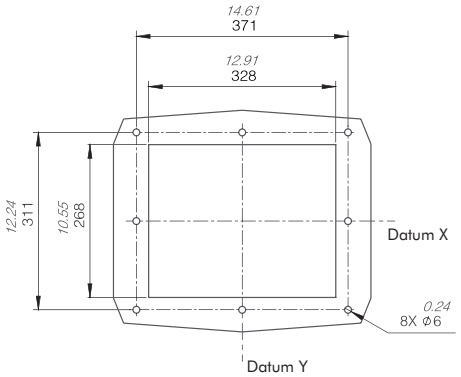
Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type C and D wiring mode)

Overall Dimensions

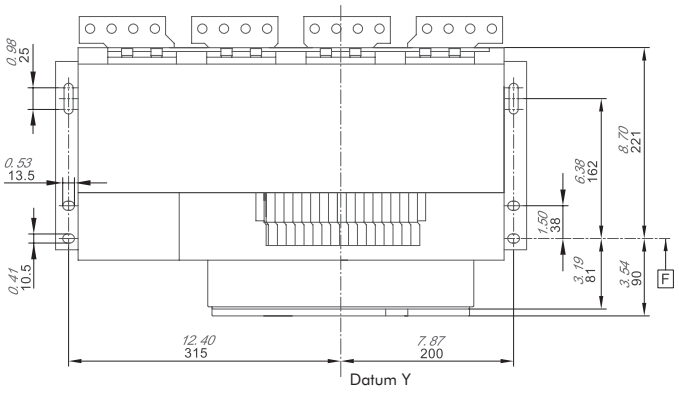
in.
mm



Installation Dimensions



Panel Perforating Size



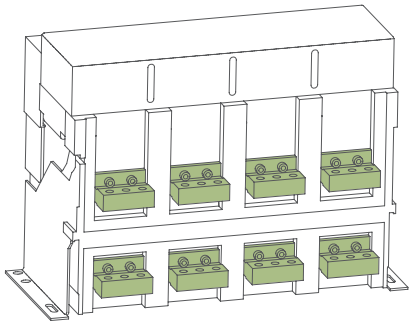
Fixed Horizontal Position (on base plate or rail)

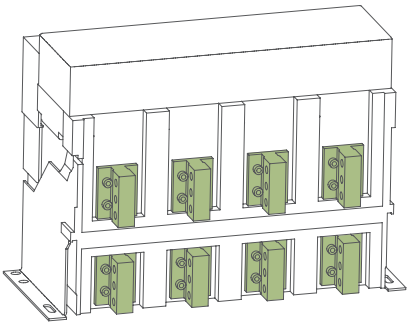
Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type C and D wiring mode)

Installation dimension of busbar horizontal connection without DC connection plate 1600A~2500A

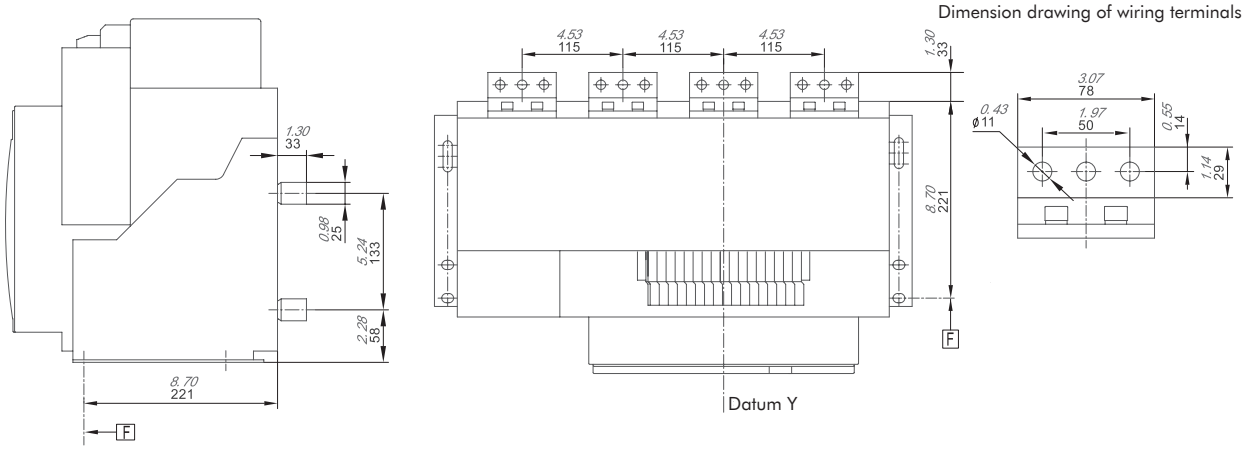
in.
mm





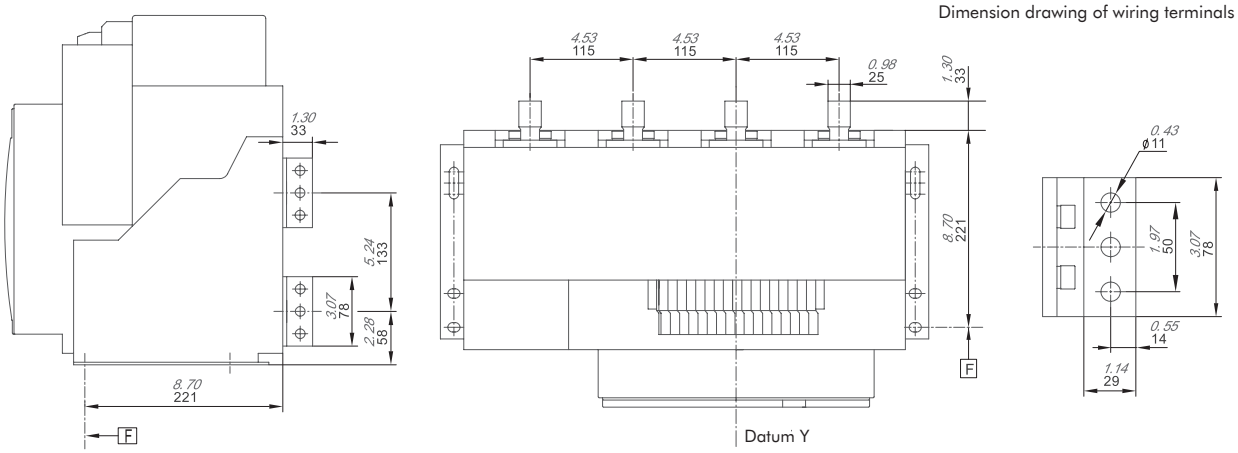
Horizontal Connection

Dimension drawing of wiring terminals



Vertical Connection

Dimension drawing of wiring terminals

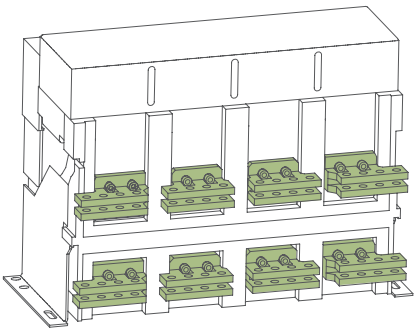


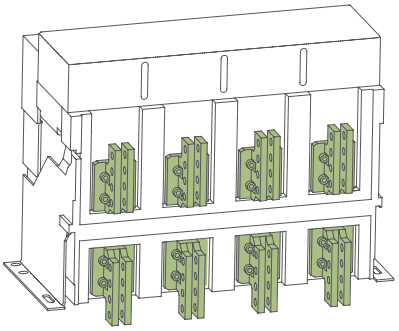
Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Fixed-type (type C and D wiring mode)

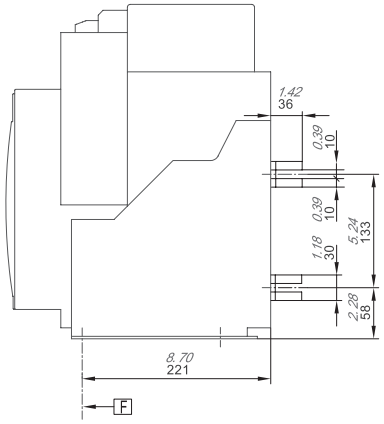
Installation dimension of busbar vertical connection without DC connection plate 3200A~4000A

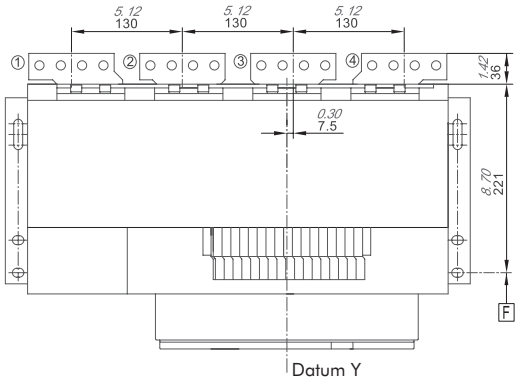
in.
mm



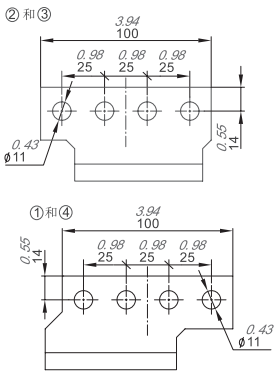


Horizontal Connection

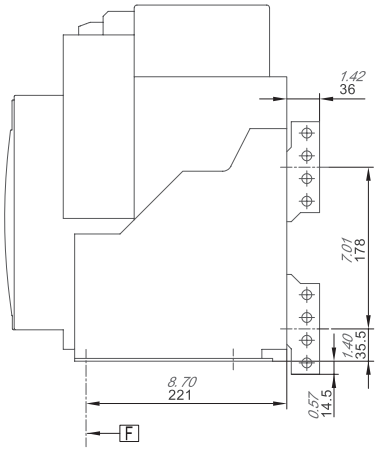


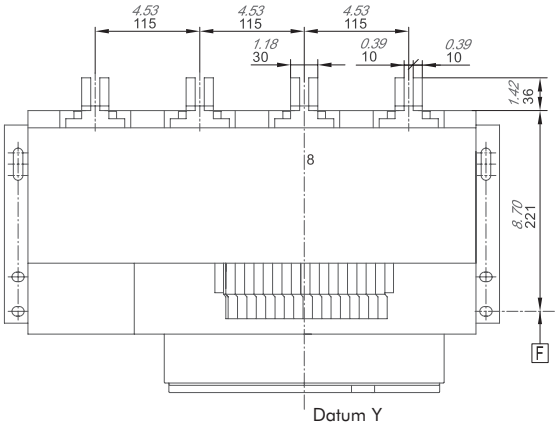


Dimension drawing of wiring terminals

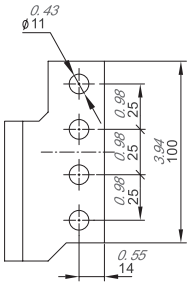


Vertical Connection





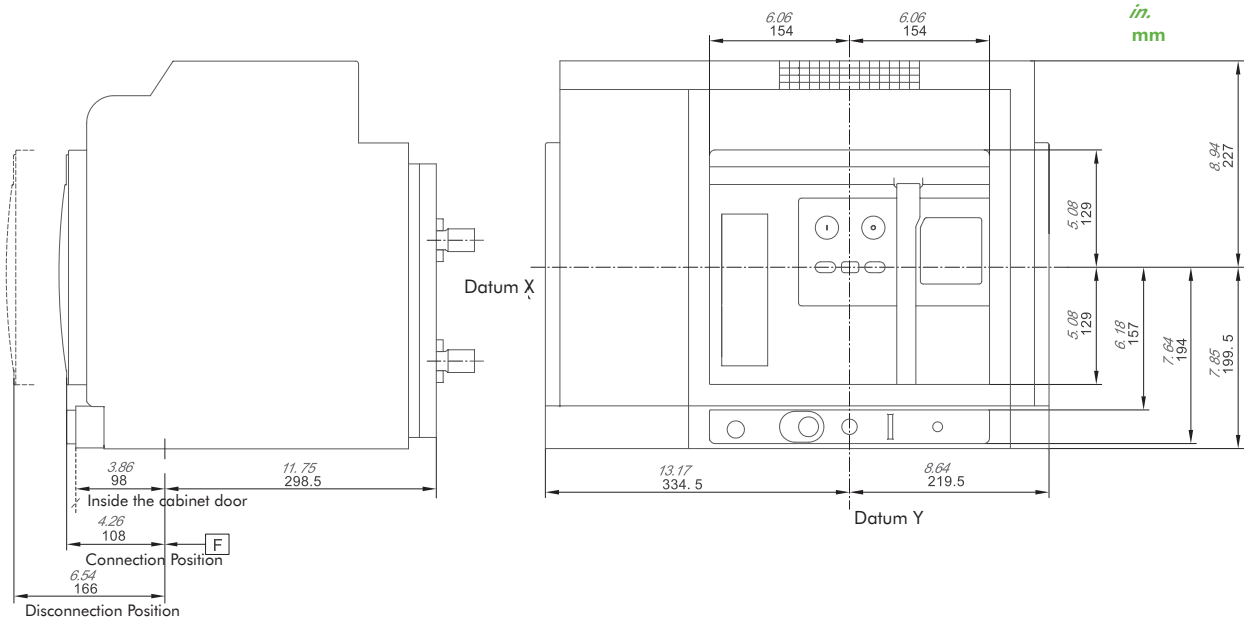
Dimension drawing of wiring terminals



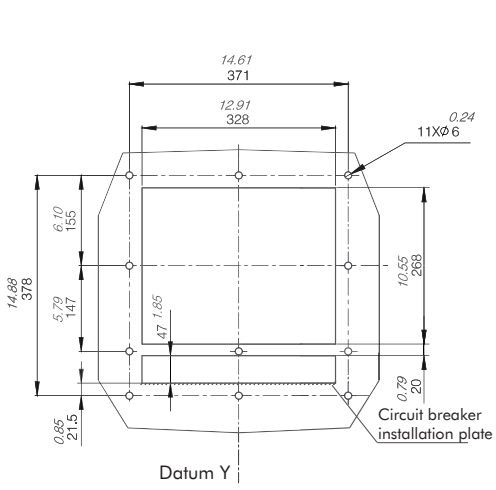
Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type C and D wiring mode)

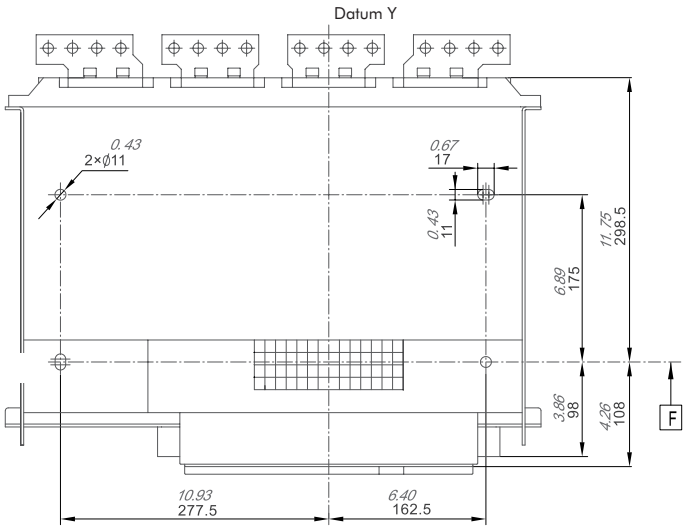
Overall Dimensions



Installation Dimensions



Panel Perforating Size



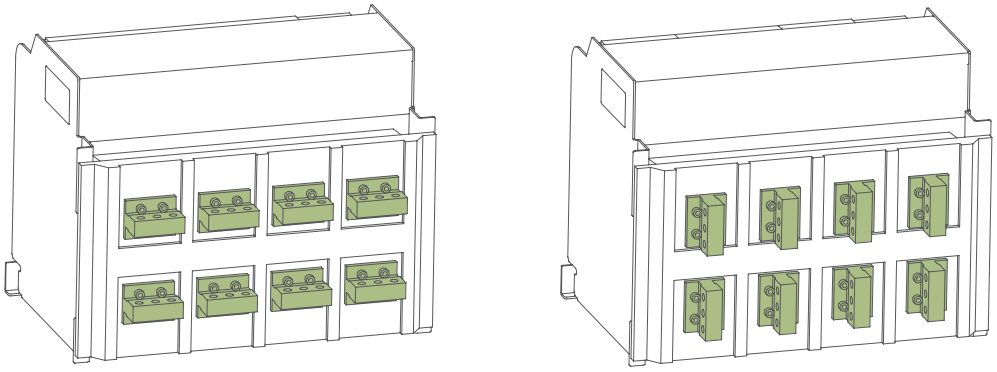
Fixed Horizontal Position (on base plate or rail)

Size of Circuit Breaker

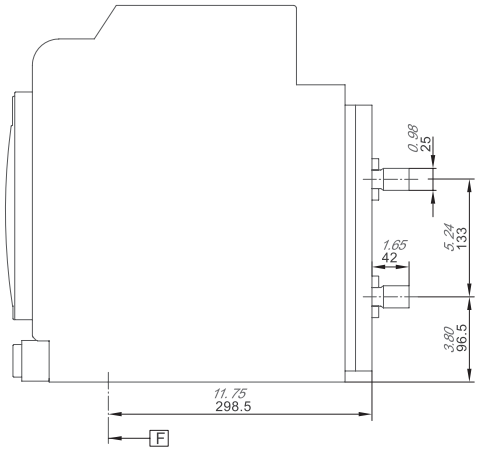
Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type C and D wiring mode)

Generatrix horizontal connection size without DC connection plate
1600~2500A

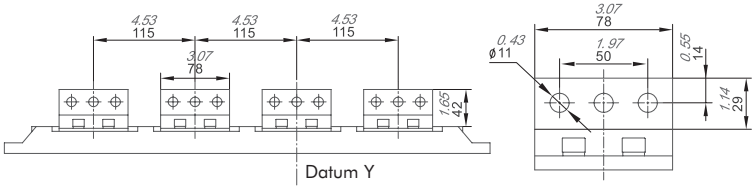
in.
mm



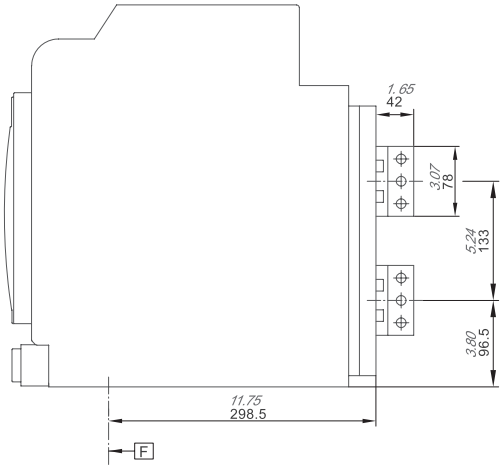
Horizontal Connection



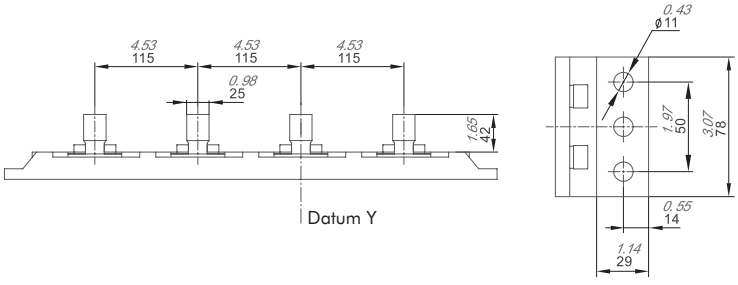
Dimension drawing of wiring terminals



Vertical Connection



Dimension drawing of wiring terminals

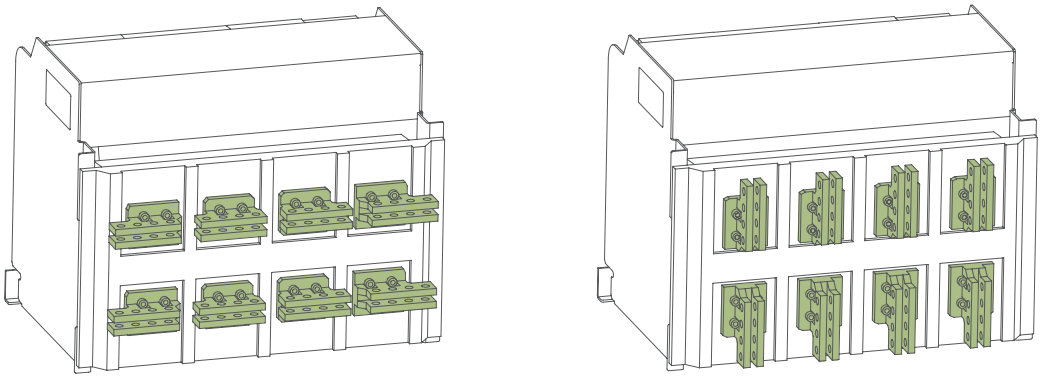


Size of Circuit Breaker

Ex9A40DC/Ex9ASD-4000DC
Drawer-type (type C and D wiring mode)

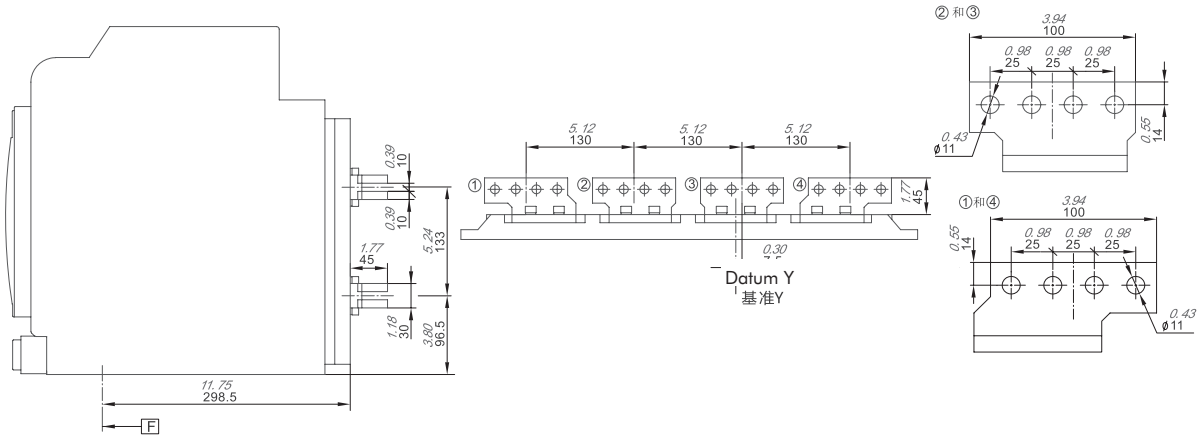
Vertical generatrix connection size without DC connection plate
3200A~4000A

in.
mm



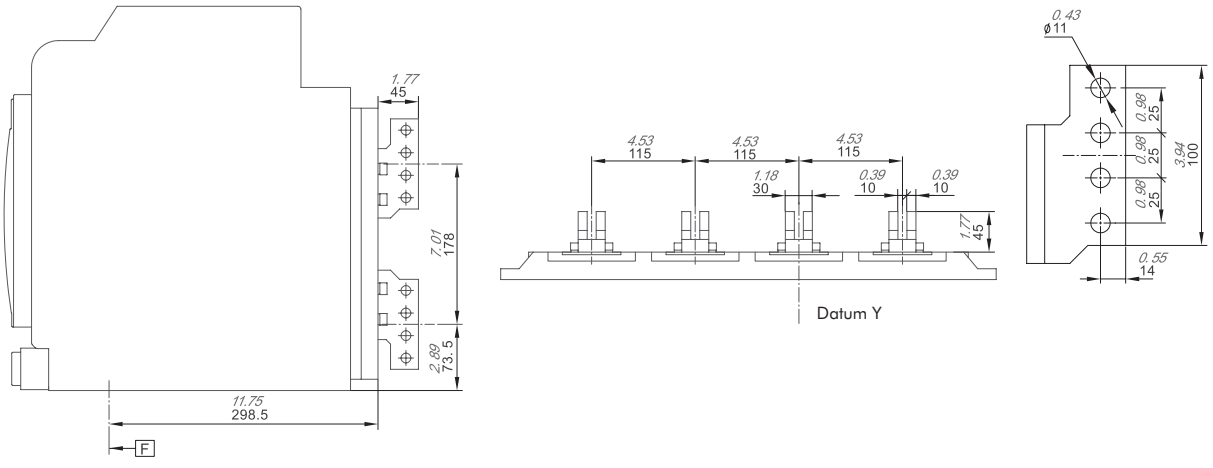
Horizontal Connection

Dimension drawing of wiring terminals
2 and 3



Vertical Connection

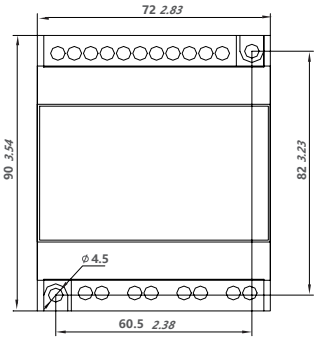
Dimension drawing of wiring terminals

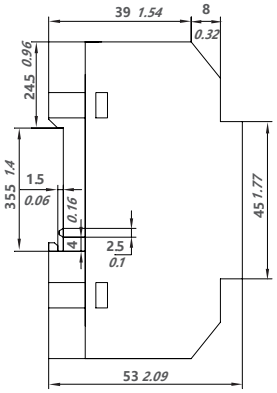


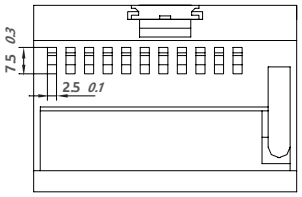
Size of Accessory

Relay signal module (M6C) and power supply module (AD)

■ The two modules are installed with 35mm standard guide rail and direct fixing, with the same appearance and installation dimension:

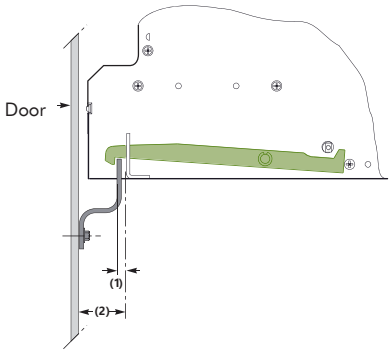




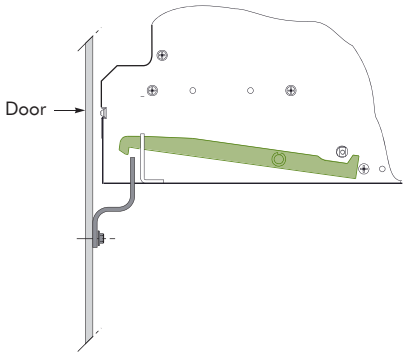


Door Interlock

■ A door interlock is installed on the right side of the drawer base to prevent the circuit breaker from opening the cabinet door when in the "connected" or "test" position. If the door is open and the circuit breaker body is in the "connected" position, the door can be closed without disconnecting the circuit breaker.



Circuit breaker door does not open in "connected" or "test" position



The door can be opened when the circuit breaker is in the "Exit" position

Dimension (mm)

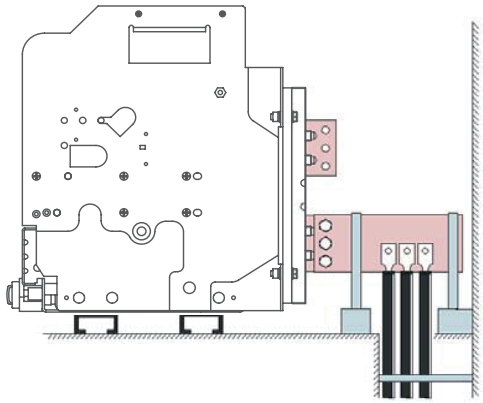
Model	(1)	(2)
Ex9A16	7	39
Ex9A32/40	7	42

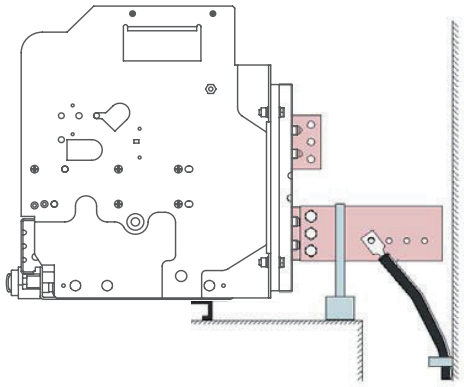
Connection of Circuit Breaker

Connection of circuit breaker

Cable connection

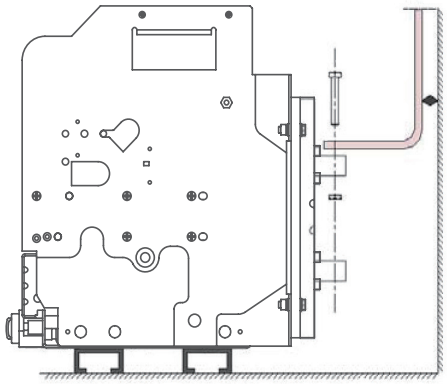
■ Ensure that there is no excessive mechanical force on the circuit breaker terminals, position the cable lug with the terminal of the connector connecting the busbar extension circuit breaker before inserting the bolt; Cables shall be securely fixed to the rack of the distribution cabinet.

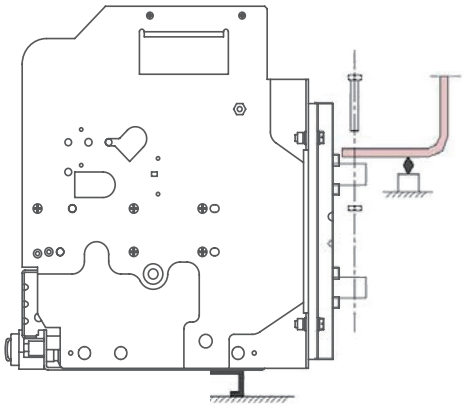




Busbar Connection

■ Properly adjust the connecting busbar to ensure that the connecting point is well positioned before the bolt is inserted, so that the connecting busbar is supported and fixed. The support shall be fixed on the frame of the distribution cabinet, so that the circuit breaker terminal does not have to bear its weight (the support shall be installed near the terminal).



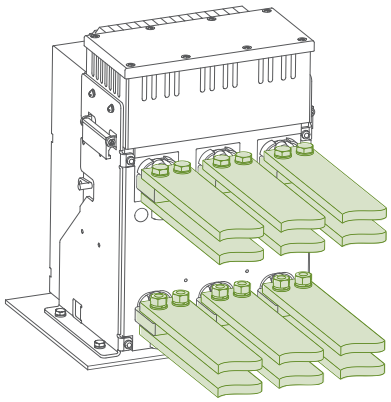


Connection of Circuit Breaker

Specification of connecting busbar

Specification reference of connecting busbar at different temperature

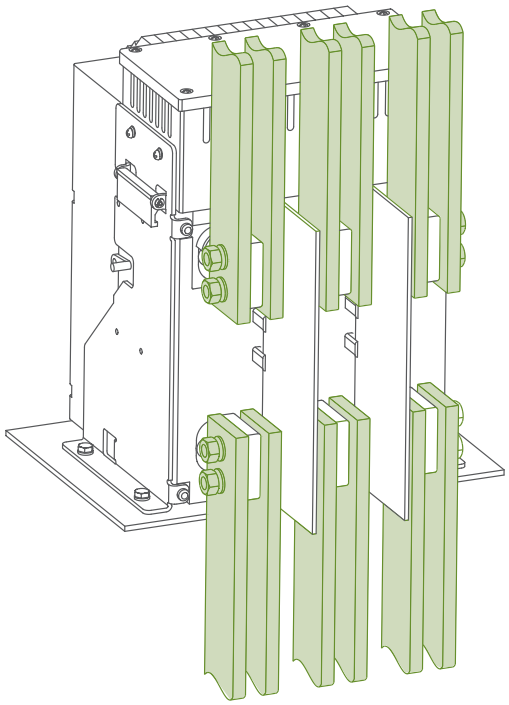
- Maximum allowable temperature of busbar: 100℃
- Busbar material is bare copper



Front or rear horizontal connection

Frame current	Rated Current	Ambient Temperature: -5~40℃				Ambient Temperature: 50℃				Ambient Temperature: 60℃			
		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar	
		Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification
2500	630	2	50×5	1	50×10	2	50×5	1	50×10	2	50×5	1	50×10
	800	2	60×5	1	60×10	2	60×5	1	60×10	2	60×5	1	60×10
	1000	2	60×5	1	60×10	2	60×5	1	60×10	3	60×5	2	50×10
	1250	3	60×5	2	50×10	3	60×5	2	50×10	4	60×5	2	60×10
	1600	4	60×5	2	60×10	4	60×5	2	60×10	4	80×5	3	60×10
	2000	4	80×5	3	60×10	4	80×5	3	60×10	-	-	4	60×10
	2500	-	-	4	60×10	-	-	4	60×10	-	-	3	80×10
4000	1600	3	80×5	2	60×10	3	80×5	2	80×10	3	80×5	2	60×10
	2000	4	80×5	2	80×10	4	80×5	2	100×10	4	80×5	2	80×10
	2500	4	100×5	2	100×10	4	100×5	2	100×10	4	100×5	3	100×10
	3200	-	-	4	100×10	-	-	5	100×10	-	-	5	100×10
	4000	-	-	5	100×10	-	-	6	100×10	-	-	7	100×10

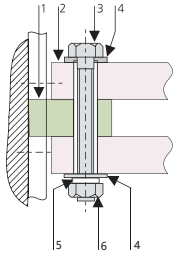
Connection of Circuit Breaker



Rear vertical connection

Frame Current	Rated Current	Ambient Temperature: -5~40℃				Ambient Temperature: 50℃				Ambient Temperature: 60℃			
		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar	
		Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification
2500	1000	2	60×5	1	60×10	2	60×5	1	60×10	2	60×5	1	60×10
	1250	3	60×5	2	50×10	3	60×5	2	50×10	3	60×5	2	50×10
	1600	4	60×5	2	60×10	4	60×5	2	60×10	4	80×5	3	60×10
	2000	4	80×5	3	60×10	4	80×5	3	60×10			4	60×10
	2500			4	60×10			4	60×10			3	80×10
4000	3200	6	100×5	4	100×10	6	100×5	4	100×10	-	-	5	100×10
	4000	-	-	5	100×10	-	-	5	100×10	-	-	6	100×10

Connection of Circuit Breaker



1 Terminal
2 Busbar
3 Bolts
4 Flat washer
5 Spring washer
6 Nut

Connection tightening torque

Bolt configuration

Bolt type	Application	Tightening torque
M10	Installation bolts for air circuit breaker	45Nm

Busbar opening

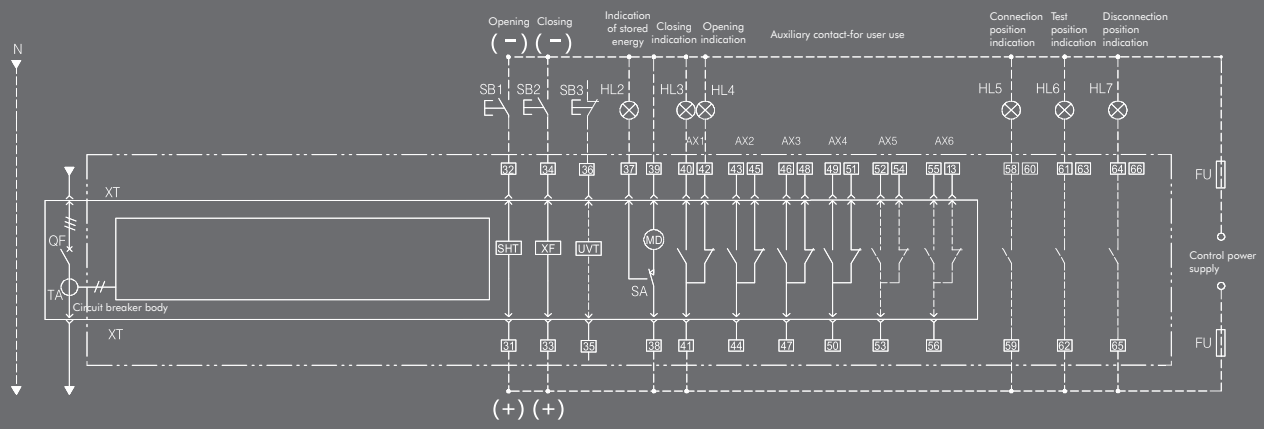
Borehole φ (mm)	Screw diameter	Tightening torque (Nm)
11	M10	40~50

Different current specifications will have different number of openings, please refer to the busbar connection in the chapter of circuit breaker size;

Ex9A
Air circuit breaker

WIRING DIAGRAM

G
01-02



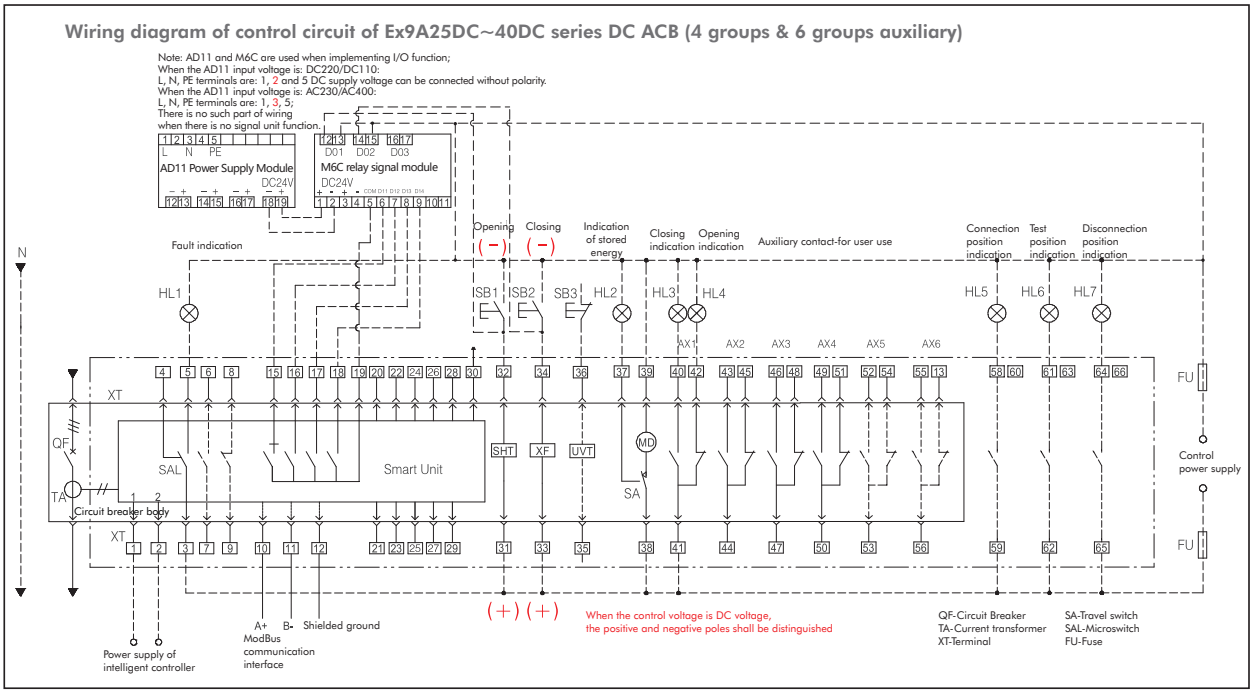
Ex9A
Air circuit breaker

WIRING DIAGRAM

G

Ex9A25DC~Ex9A40DC secondary wiring diagram

Wiring diagram of control circuit of Ex9A25DC~40DC series DC ACB (4 groups & 6 groups auxiliary)



■ Power Input

1#, 2#: Auxiliary power supply input, when the power supply of the selected type control circuit is AC voltage, it can be directly connected to the AC voltage consistent with the selection; When the power supply of the selected control circuit is DC voltage, it shall be connected to 1# and 2# after being converted and output by the power module.

■ Fault tripping auxiliary signal

3#, 4#, 5#: Fault Trip Signal Output
Auxiliary signal contact capacity: AC380V, 2A; DC250V, 0.3A; The fault signal light HL1 is provided by the user.

■ Synchronizing auxiliary signal with circuit breaker (optional function)

6#, 7#: Circuit breaker signal status output (NO contact);
8#, 9#: Circuit breaker signal status output (NC contact);
Auxiliary signal contact capacity: AC380V, 1A; DC250V, 0.15A; It can also output 2NO or 2NC signals, and users need special instructions when ordering; Optional configuration, and 6#~9#are empty for regular supply.

■ Communication output-(only available for communication type intelligent controller)

10#, 11#: Communication interface output, wherein 10#is A+ and 11#is B-;
12#: Communication shield ground wire.

■ Programmable signal output interface (optional function)-(with signal unit intelligent controller)

15#~18#: 4 programmable output contacts, DO output contact capacity: DC24V, 5mA, of which the typical wiring is 15#to output remote opening signal, 16#to output remote closing signal, 17#and 18#can be configured freely according to the use requirements. 19#: Common points of programmable contacts; When it is used to control the opening and closing of the circuit breaker or the load capacity is large, the M6C relay module shall be used for conversion before control.
The contact capacity of relay signal module is: AC250V, 10A; DC28V, 10A。

■ Programmable signal input interface (optional function)-(with signal unit)

20#, 21#: A programmable input interface DI1; 22#, 23#: A programmable input interface DI2; DI input contact capacity: DC24V, no input polarity requirement for DC input.

■ Voltage display signal input-(with P-type controller)

24#, 27#: 24#is the DC + voltage input terminal, and 27#is the DC-voltage input terminal.

■ Protective Ground Wire

30#: The protective ground wire is connected to the outer side plate of the circuit breaker body.

■ SHT Shunt Trip

31#, 32#: Operating power input of shunt trip (SHT), if the operating voltage is DC, 31#is positive and 32#is negative. SB1 opening button is provided by the user.
If the shunt trip needs to be connected in series with the main body, please consult with manufacturer.

■ XF Closing electromagnet

33#, 34#: XF closed coil working power input, if the working voltage is DC, 33#is positive and 34#is negative. SB2 closing button is provided by the user.
If the closing electromagnet needs to be connected with the main body in series, please consult with manufacturer.

■ UVT under-voltage release (optional configuration)

35#, 36#: Working power input of UVT under-voltage release;
SB3 emergency disconnect button is provided by the user.
The under-voltage release is specially ordered and is normally supplied without wiring.

■ Working power supply of MD energy storage motor

37#, 38#, 39#: Working power input of MD energy storage motor;
HL2 energy storage indicator is provided by the user.

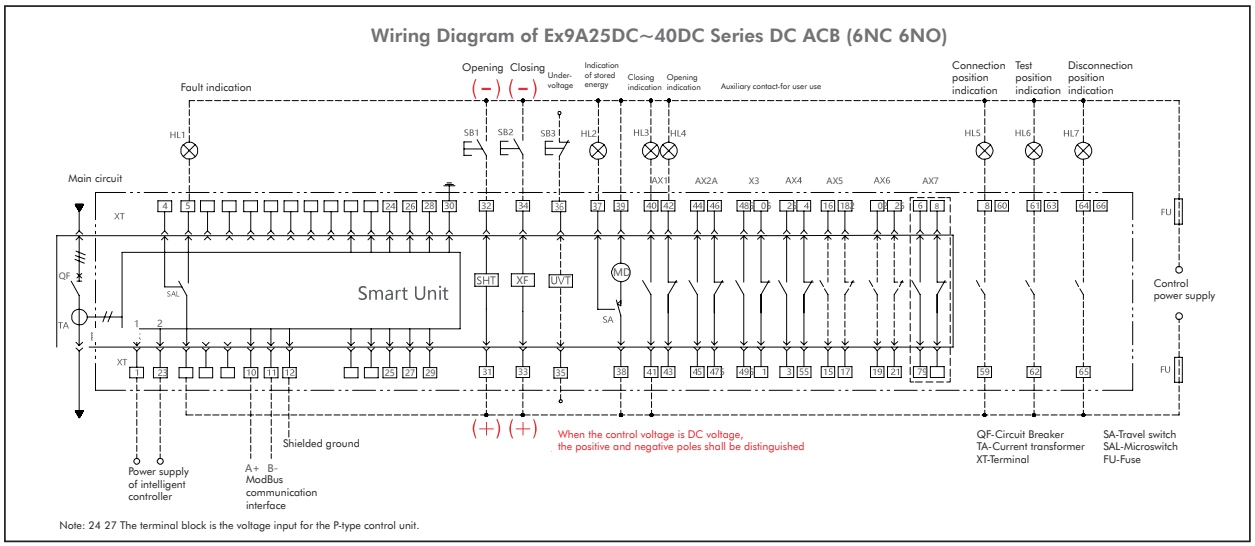
■ AX1~AX6 Auxiliary Contact

40#~51#(AX1~AX4): Conventional supply is provided with 4 groups of auxiliary contacts;
52#~56#, 13#(AX5~AX6): Two additional groups of auxiliary contacts are used for 6 groups of auxiliary contacts for special order, and there is no wiring for conventional supply.
HL3 and HL4 status indicators are provided by the user.

■ Three-position indication of drawer-type circuit breaker (optional configuration)

58#~60#: Connection position indication;
61#~63#: Test position indication;
64#~66#: Disconnection position indication;
HL5, HL6 and HL7 signal indicator lights are provided by the user, this function is only applicable to the drawer-type circuit breaker of special order, and there is no wiring for conventional supply.

Ex9A25DC~Ex9A40DC secondary wiring diagram



■ Power Input

1#, 2#: Auxiliary power supply input, when the power supply of the selected type control circuit is AC voltage, it can be directly connected to the AC voltage consistent with the selection; When the power supply of the selected control circuit is DC voltage, it shall be connected to 1# and 2# after being converted and output by the power module.

■ Fault tripping auxiliary signal

3#, 4#, 5#: Fault trip signal output auxiliary signal contact capacity: AC380V, 2A; DC250V, 0.3A;
The fault signal light HL1 is provided by the user.

■ Communication Output

10#, 11#: Communication interface output, wherein 10#is A + and 11#is B-;
12#: Communication shield ground wire.

■ Voltage display signal input

24#, 27#: 24#is the DC + voltage input terminal, and 27#is the DC-voltage input terminal.

■ Protective Ground Wire

30#: The protective ground wire is connected to the outer side plate of the circuit breaker body;
12#: Communication shield ground wire.

■ SHF Shunt Trip

31#, 32#: Operating power input of shunt trip (SHT);
SB1 opening button is provided by the user.
If the shunt trip needs to be connected in series with the main body, please consult with manufacturer.

■ XF closed coil

33#, 34#: Working power input of XF closed coil;
SB2 closing button is provided by the user.
If the closing electromagnet needs to be connected with the main body in series, please consult with manufacturer.

■ UVT under-voltage release (optional configuration)

35#, 36#: Working power input of UVT under-voltage release;
SB3 emergency off button is provided by the user. In case of under-voltage delay release, after SB3 is pressed, the circuit breaker will trip after corresponding delay; The under-voltage release is specially ordered and is normally supplied without wiring.

■ Working power supply of MD energy storage motor

37#, 38#, 39#: Working power input of MD energy storage motor;
HL2 energy storage indicator is provided by the user.

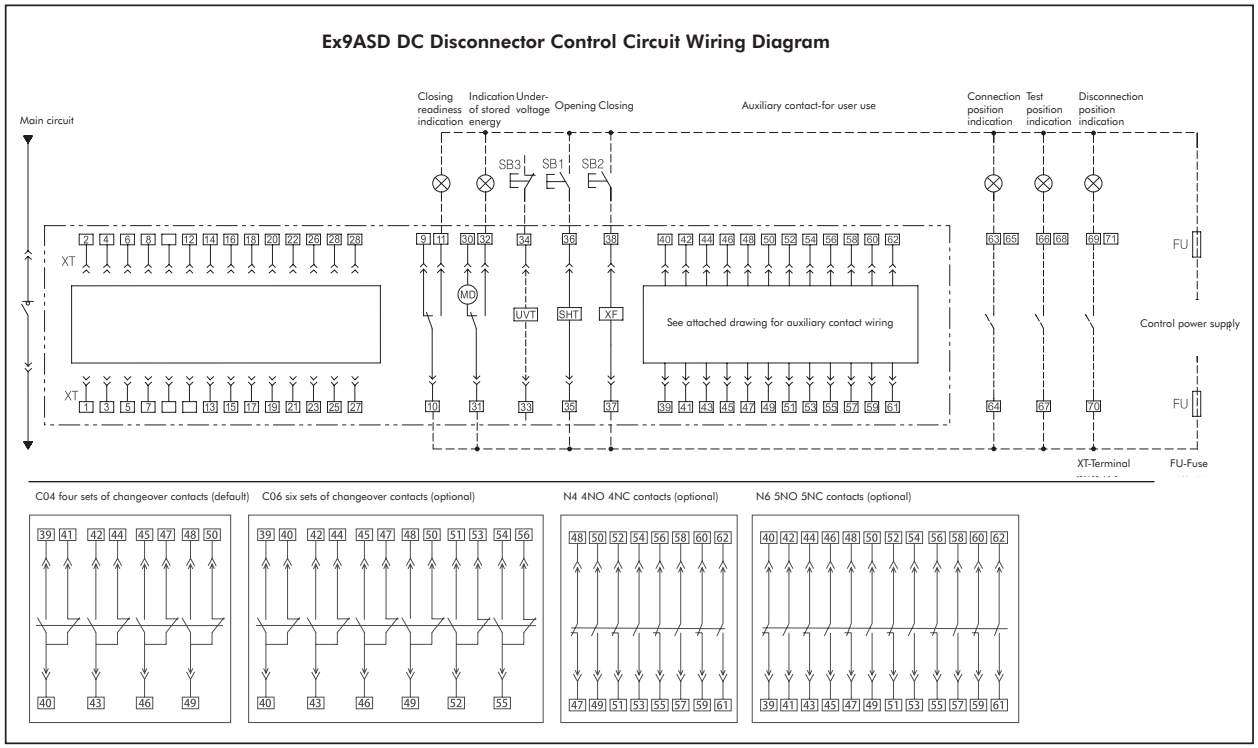
■ AX1~AX6 Auxiliary Contact

40#~55#, 15#~22#(AX1~AX6): 6NO 6NC auxiliary contacts are configured for special supply;
6#~9#(AX7): Add 1 set of 1 NO and 1 NC auxiliary contacts for special orders.
HL3 and HL4 status indicators are provided by the user.

■ Three-position indication of drawer-type circuit breaker (optional configuration)

58#~60#: Connection position indication;
61#~63#: Test position indication;
64#~66#: Disconnection position indication;
HL5, HL6 and HL7 signal indicators are provided by the user;
This function is only applicable to specially ordered drawer-type circuit breakers, and there is no wiring for regular supply.

Ex9ASD secondary wiring diagram



■ PF Ready to close contact (optional configuration)

9#~11#: Electrical signal indication of closing readiness;
The indicator light shall be provided by the user;
This function is an optional accessory, and the wiring is not available for conventional products.

■ MD Energy storage motor

30#~32#: Working power input of the energy storage motor;
Energy storage indicator is provided by the user.

■ UVT under-voltage release (optional configuration)

33#, 34#: Working power input of under-voltage release;
SB3 emergency disconnect button is provided by the user.
The under-voltage release is specially ordered and is normally supplied without wiring.

■ SHT Shunt Trip

35#, 36#: Operating power input of shunt trip;
SB1 opening button is provided by the user.

■ XF Closing electromagnet

37#, 38#: Working power input of XF closed coil;
SB2 closing button is provided by the user.

■ AX Auxiliary Contact

39#~62#: Wiring of auxiliary contact group;
C04 is the regular configuration, and C60, N4 and N6 are the special ordering configuration.

■ Three-position indication of EF drawer-type disconnector (optional configuration)

63#~71#: Electrical signal indication of link, test and disconnection positions of drawer-type disconnector;
The indicator light shall be prepared by the user.
Only drawer-type products can be equipped with this accessory, and this wiring is not available for regular supply.