SF$_6$-FREE

Airing

Pure Dry Air Insulated Ring Main Unit

Secondary Distribution
24kV, …630A, …20kA

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Contents

Application

Airing 24kV RMU is suitable for a variety of medium-voltage distribution network applications, providing reliable, safe and eco-friendly solutions for urban, industrial, commercial and new energy systems.

Infrastructure

It serves critical load scenarios such as urban distribution networks, subways, airports, hospitals and data centers

It enables safe and compact medium-voltage power distribution in complex spaces.

■ Features: Uninterrupted Power Supply / Arc Protection / Intelligent Interconnection

New Energy

Applied to the power generation systems of wind farms, photovoltaic plants and energy storage power stations.

It is compatible with cabin transformer/box-type transformer systems to ensure the efficient grid connection of green energy

■ Features: Stable Grid Connection / High Environmental Adaptability / Remote Monitoring

Industrial Parks

It serves the ring network systems of industrial plants and intelligent manufacturing parks.

High reliability ensures production continuity and meets the requirements of automated control.

■ Features: Stable Operation / Communication Interfaces / Remote Maintenance

Residential and Commercial Complexes

It is suitable for the secondary distribution systems of large shopping malls, office buildings and residential areas.

The modular design supports quick installation and expansion, shortening the construction period.

■ Features: Modular Installation / Energy-Efficient Operation / Low Maintenance Cost

"From urban distribution networks to new energy systems, Airing 24kV delivers reliable solutions for eco-friendly green power distribution."

Environmental and Operating Conditions

Switchgear is generally operated in the indoor environment of buildings or structures

General Environmental Conditions

- Storage temperature range: -25℃ ~ +60℃
- Operating temperature range: -25℃ ~ +40℃
- Relative humidity: ≤ 95%
- Altitude of application: ≤ 2000 m
- Corrosion resistance class: C3L

It complies with IEC 62271 standards. For special environmental conditions that differ from the above general environmental conditions, the manufacturer and the end user must reach an agreement.

Hazards of Incorrect Operating Conditions

- When the Airing switchgear is in operation, the ambient temperature must be maintained between -25℃ and +40℃.
- When the ambient temperature ranges from 40℃ to 60℃, the rated current derating of the Airing switchgear shall be carried out in accordance with the following requirements.

Failure to comply with the above instructions may result in personal injury or equipment damage.

Ambient Temperature	40℃	45℃	50℃	55℃	60℃
Bus 630A	630A	600A	570A	540A	510A
C/D Function	630A	600A	570A	540A	510A

Highlights

SF_6-FREE	Pure and dry air serves as the insulating and/or arc-quenching medium, with GWP=0.
SAFETY	The inflation pressure (absolute pressure at 20℃) of the insulating and/or arc-quenching gas in the gas-filled compartment is only 0.15 MPa.
RELIABLE	The insulation of the gas-filled compartment at 0 gauge pressure (abs.20℃) [0.10 MPa] meets the Ud of 50/60 kV specified in the IEC standards.
COMPACTNESS	It features a standard modular design and a compact structure, enabling flexible combination of unit cabinets and common-box cabinets.
INTELLIGENCE	It can be equipped with Xiamen Huadian iEDS Intelligent Digital Detection System.
CERTIFICATIONS	It complies with IEC standards and GB standards, holds TÜV Rheinland certification, and meets the requirements of the EU F-gas Regulation (EU) 2024/573.

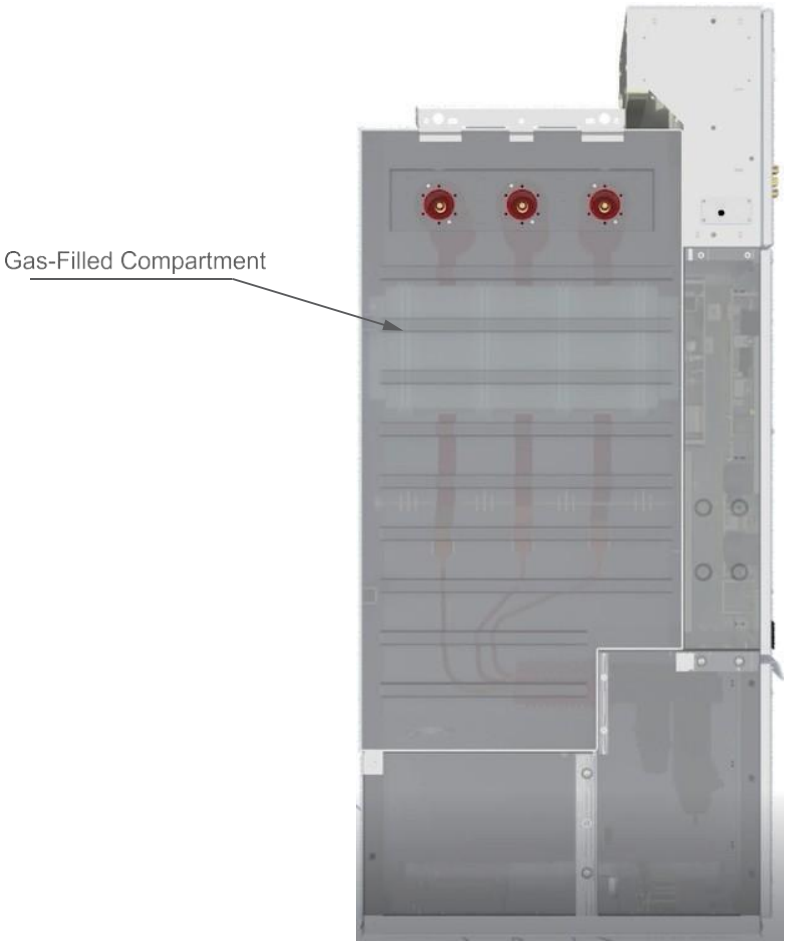
Gas-Filled Compartment Insulation at Zero Gauge Pressure

The insulation of the gas-filled compartment at zero gauge pressure (abs.20℃) [0.10 MPa] meets the Ud of 50/60 kV specified in the IEC standards.

The insulation performance of the equipment at a lower rated inflation pressure and zero gauge pressure can effectively eliminate the interference to the performance of insulating medium caused by reduced inflation pressure and temperature changes, thereby enhancing the safe and reliable operation capability of the equipment.

It can better meet the application scenarios in plateau environments, providing customers with more environmentally friendly Ring Main Units (RMUs).

In extreme cases, such as the complete leakage of insulating gas, it can effectively ensure the reliable operation of the equipment and protect personnel safety.

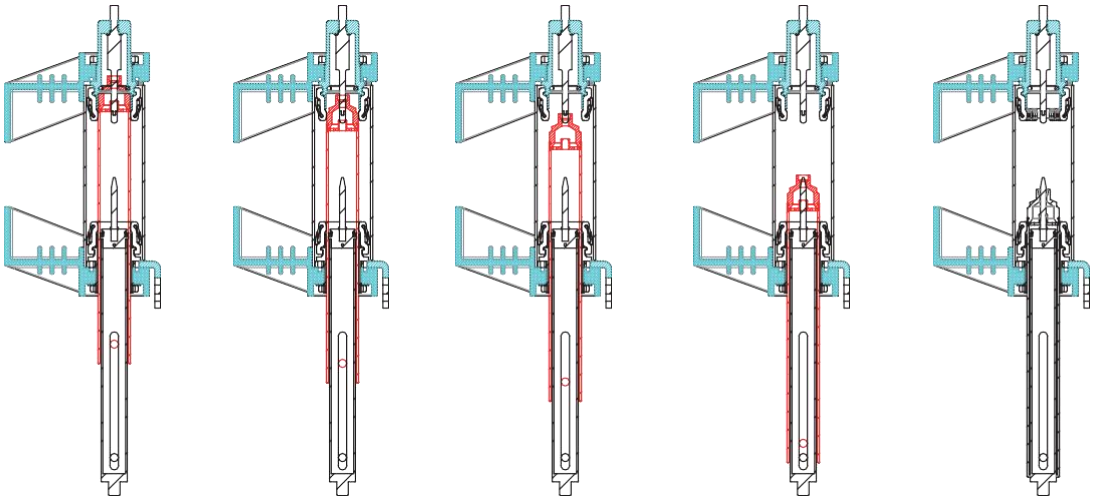


Principle of Self-Energy Load Break Switch

This self-energy load Break switch, which integrates pressure-type arc extinguishing and gas-generating arc extinguishing technologies, is an original product independently developed by Huadian.

Based on the mature technology of high-voltage GIS, it features a compact and highly efficient structural design with utility model patents and invention patents, perfectly integrating environmental friendliness, superior performance and cost-effectiveness.

This self-energy load Break switch integrates pressure-type arc extinguishing and gas-generating arc extinguishing technologies. High-density, high-velocity dry air flows through the gas circuit, and is blown toward the electric arc from the self-energy chamber and expansion chamber via small and large nozzles. (The specially designed gas circuit also directs the high-density air flow to the arc roots simultaneously.) This extinguishes the electric arc at current zero-crossing, ensuring reliable interruption of the circuit.

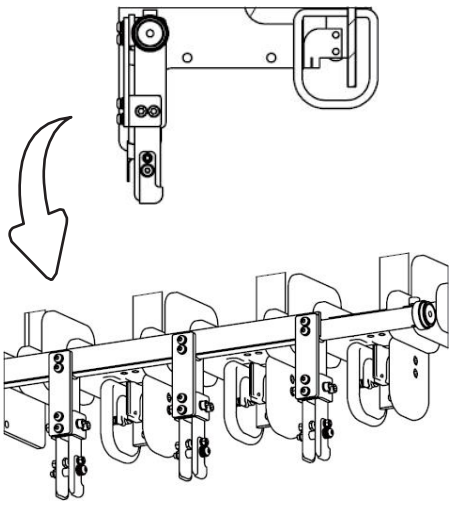


Closing Position | Initial Opening Position | Pressure Relief Position | Buffering Position | Opening Position

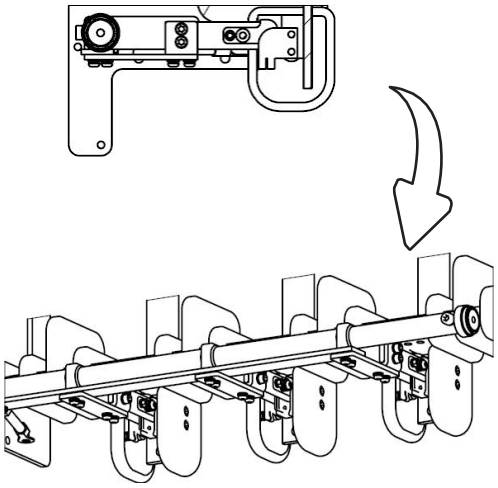
Core Performance and Technical Advantages of Airing Earthing Switch

As a key protection device in medium-voltage distribution systems, the Airing Earthing Switch stably meets the E2-class closing requirements—it can withstand 5 operating cycles under the rated short-circuit closing current, adapts to the "low maintenance" needs of systems 24kV and below, and provides core support for grid maintenance safety and stable equipment operation. Its four core technical advantages deliver strong market competitiveness.

- Innovative Structure: Adopts a "main contact + arcing contact" dual-contact design, solving industry pain points through precise action timing. During closing, the arcing contact makes first contact to bear the high-temperature electric arc; during opening, it separates with a delay to cut off the arc path. The main contact focuses solely on stable current transmission, thoroughly resolving the functional conflict between corrosion resistance and electrical conductivity in single-contact designs.
- Targeted Material Strategy: Achieves differentiated and precise adaptation. The arcing contact uses copper-tungsten alloy with an ablation rate of only 1-3mg/C. Relying on the high-temperature resistance of the tungsten skeleton and the self-cooling effect of the copper phase, its arc resistance is far superior to pure copper. The main contact uses high-purity electrolytic copper with a conductivity close to 100% IACS, ensuring low-loss current transmission and forming a performance synergy
- Optimized Working Conditions: Leverages 3D simulation technology to achieve millimeter-level control of pre-breakdown, ensuring that electric arcs are generated only in the arcing contact area and protecting the main contact from thermal damage.
- Manufacturing Advantages: Features a compact knife-switch structure and quick screw connection design. Its compact form fits the narrow indoor installation space of RMU equipment, reduces assembly time, and significantly lowers the whole-life cycle cost.



Opening Position



Closing Position

Highlights

Airing is an eco-friendly gas-insulated ring main unit with a rated voltage of 24 kV. Adopting an all-metal enclosed structure and modular design, the product integrates a self-energy load switch and a circuit breaker, and is specially designed for urban distribution networks, industrial power distribution systems and renewable energy grid-connection scenarios.

With the new-generation eco-friendly insulating medium, highly reliable self-energy load switch technology and vacuum interruption technology, Airing 24 maintains compact dimensions and excellent performance while completely eliminating SF_6 gas, achieving zero greenhouse gas emissions, low operation and maintenance requirements, and full life-cycle sustainability.

Typical Applications

- Urban distribution networks and secondary distribution systems
- Industrial parks, commercial complexes and public buildings
- Grid-connection systems for new energy sources such as photovoltaic and wind power
- Rapidly developing fields including rail transit and data centers

Modular Combination Design

Airing 24 is equipped with a variety of functional units that can be flexibly combined to adapt to different power supply scenarios, and provides efficient two-compartment and three-compartment integrated solutions.

- C = Self-energy Load Switch with Earthing Switch
- D = Vacuum Circuit Breaker with Three-position Isolation and Earthing Switch

Compact Design

- All functional units in the Airing 24 series adopt a standard modular design with a compact structure. The width of the C unit is only 400 mm, delivering high space utilization efficiency.

Innovative Design

- The core unit of Airing 24 adopts an original self-energy load switch independently developed by Huatech. Based on the mature technology of high-voltage GIS, this switch integrates both puffer-type arc extinguishing and gas-generating arc extinguishing functions. Its compact and highly efficient structural design has been awarded utility model patents and invention patents, perfectly integrating environmental friendliness, performance and cost-effectiveness.

- The vacuum circuit breaker features ultra-low resistance. All primary live components are encapsulated in a stainless steel gas tank filled with eco-friendly gas, isolated from the external environment. This design ensures that the switchgear inside the tank and all primary live parts are not affected by the external environment.

- Airing 24 adopts state-of-the-art airtightness technology, which ensures the expected annual gas leakage rate of the equipment is less than 0.01% (this data is based on an inflation pressure of 0.15MPa). Throughout the entire design life of the switchgear, it will consistently maintain excellent airtightness, with internal air pressure remaining above 0.14MPa at all times, providing ample safety margin for enhanced safety and reliability.

Highlights

Eco-friendly Insulating Gas

- Airing 24 adopts an eco-friendly insulating gas with a low global warming potential (GWP=0) as the core insulating medium, fully replacing traditional high-GWP SF_6 gas, thus achieving a near-zero greenhouse gas (GHG) footprint.
- This gas has zero ozone depletion potential (ODP=0) and is classified as an environment-friendly and green gas.
- The rated charging pressure (absolute pressure) for insulation and/or arc extinction is only 0.15 MPa.

High-Safety Structure

Airing 24 fully complies with IEC 62271-200 and GB/T 3906 standards, adopting an all-metal enclosed structure and an internal arc protection scheme

- The cabinet has an internal arc rating of IAC-AFLR 20kA/1s
- The cabinet is equipped with five-proof interlocking and mechanical latching functions.
- The gas tank is made of 3mm-thick stainless steel plates and fabricated via robotic welding.

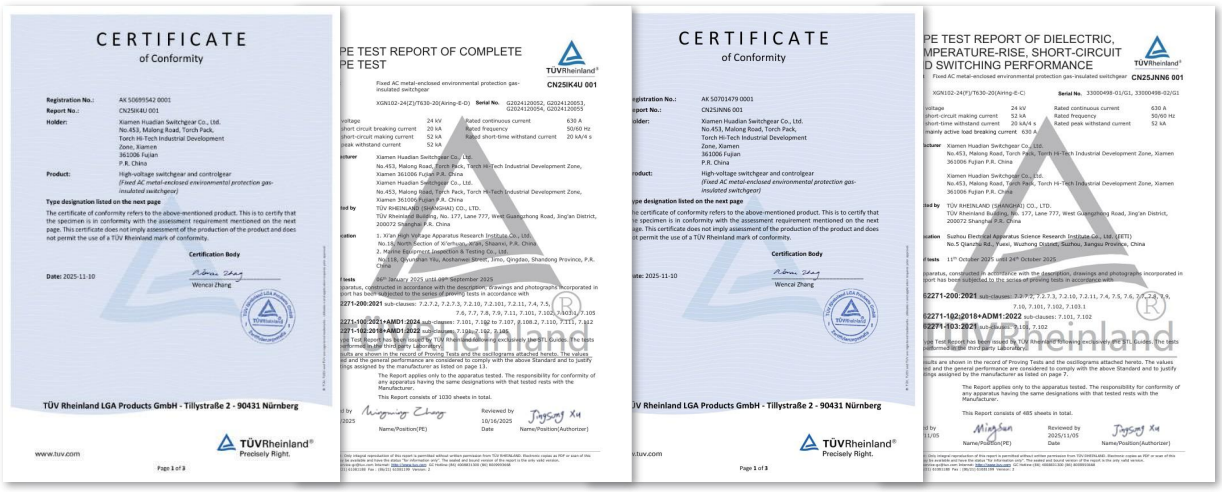
High-Reliability Operation

- The IP68-rated fully sealed gas tank mechanism completely isolates the equipment from dust and salt spray erosion, achieve a service life of more than 30 years.
- The vacuum interrupter's mechanical service life reaches 10,000 operations.
- The load switch's mechanical service life reaches 10,000 operations.
- All units have passed factory tests such as airtightness, partial discharge and mechanical operation before delivery.
- The insulation performance of the gas-filled compartment at zero gauge pressure (abs. 20℃, 0.10 MPa) meets the rated power-frequency withstand voltage of 50/60 kV specified in IEC standards.
- The short-circuit making capacity of the earthing switch can reach Class E2.

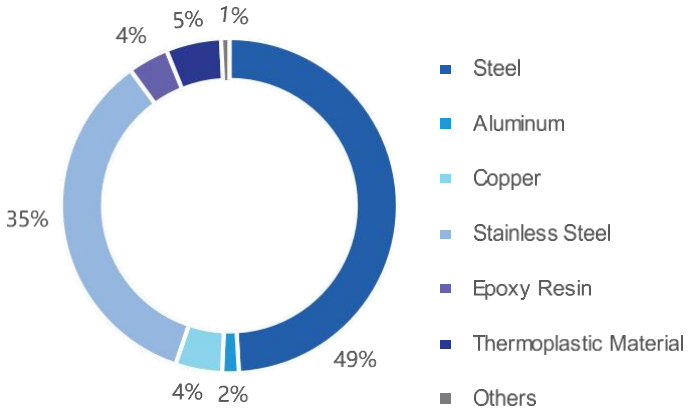
Certifications

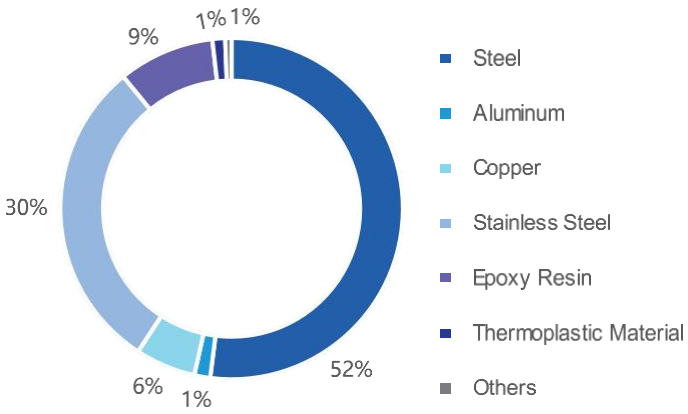
IEC Standards

IEC 62271-200	High-voltage switchgear and controlgear - Part 200: A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV
IEC 62271-100	High-voltage switchgear and controlgear-Part 100: Alternating-current circuit-breakers
IEC 62271-102	High-voltage switchgear and controlgear-Part 102: Alternating current disconnectors and earthing switches
IEC 62271-103	High-voltage switchgear and controlgear- Part 103: Switches combination for rated voltages above 1 kV up to and including 52 kV
IEC 62271-1	High-voltage switchgear and controlgear - Part 1: Common specifications
IEC 62271-2	Teil 102: Hochspannungs-Wechselstrom-Trennschalter und –Erdungsschalter
IEC 62271-213	Voltage detecting and indication system
IEC 62271-4	High-voltage switchgear and controlgear - Part 4: Handling procedures for gases for insulation and/or switching
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 60255	Electronic protection relays
IEC 61869-1	Instrument transformers - general requirements
IEC 61869-2	Current instrument transformers IEC 61869-3 voltage instrument transformers
IEC 61869-10	Low-power passive current transformers
IEC 61869-11	Low-power passive voltage transformers
IEC 60137	Cenelec EN 50181 bushings
IEC 61869-11	IEC 61869-10 combined bushings sensors
IEC 60502-4	Cable connection



Material Composition





Types of Raw Materials	Is It Recyclable	Is It Hazardous
Pure and dry air	Yes	No
Steel	Yes	No
Aluminum	Yes	No
Copper	Yes	No
Stainless Steel	Yes	No
Epoxy Resin	Yes	No
Thermoplastic Materials	Yes	No
Others	Yes	No

Green Solution for the Full Life Cycle

The Airing Environmentally Friendly Cabinet has incorporated the full life cycle assessment (LCA) concept since the design phase. From raw material selection and manufacturing processes to product scrapping and recycling, it minimizes energy consumption and environmental impact throughout the entire process.

Green Design

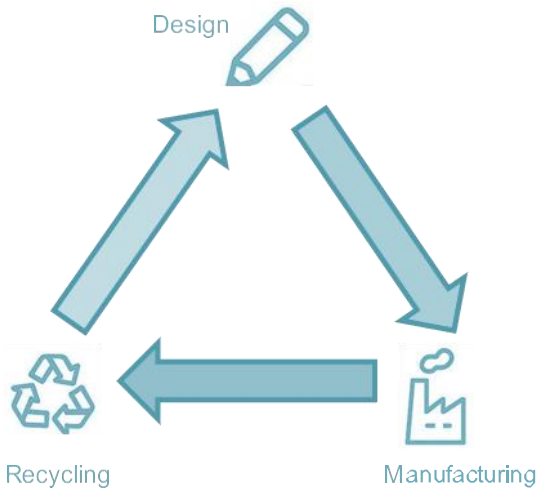
- Prioritize the use of low-carbon footprint and recyclable metals and engineering plastics
- Pure dry air is adopted as the gas insulation material with a GWP (Global Warming Potential) of 0.
- The modular structure facilitates component replacement and extends the overall service life of the equipment

Green Factory

- Comply with the international quality management system ISO 9001 and environmental management system ISO 14001 standards.
- Energy-efficient equipment and clean energy are applied in the production process
- Strictly control VOC (Volatile Organic Compounds), dust, and noise emissions across the entire factory.
- Packaging materials are degradable or reusable.

Green Recycling

- Scraped equipment can be disassembled, with the recovery rate of main materials (such as copper, aluminum, and stainless steel) exceeding 90%.
- The insulating medium can be safely released and refilled
- Establish a traceable product recycling system to achieve closed-loop management.



Compared with traditional SF_6 ring main units (RMUs),
the life cycle carbon emissions of Airing are reduced by more than 60%.

User Benefits

Environmental Friendliness

- SF_6 -Free emissions to support enterprises' green transformation.
- It employs GWP=0 environmentally friendly gas and recyclable materials, achieving a marked reduction in the life cycle carbon footprint.
- • It supports users in meeting with environmental regulations and ESG requirements, enhancing their corporate social image.
- Simplify the environmental filing process; there is no need to apply for SF_6 recovery qualifications.
- *User Value: Comply with future trends, help achieve carbon neutrality goals. and improve users' competitiveness.*

Reliable Power Supply

- The annual gas leakage rate is less than 0.01%, and achieve a service life of more than 30 years, ensuring continuous and stable power supply.
- The fully enclosed gas tank structure combined with self-energy load switch technology and vacuum interruption technology significantly improves system stability.
- Long-term maintenance-free operation effectively reduces power outage times and maintenance costs, maintaining high availability of the power distribution system.
- *User Value: More stable power supply and easier maintenance.*

Safety Protection

- Internal arc protection and five-prevention interlock design provide enhanced operational safety.
- It meets the IAC AFLR 20kA/1s internal arc standard.
- It is equipped with comprehensive mechanical interlocks and earthing protection.
- Even under extreme fault conditions, operators can still be fully protected.
- *User Value: Worry-free safe operation, preventing misoperation and personal injury.*

Intelligent Detection

- Digital sensing facilitates condition-based operation and maintenance as well as remote management.
- It can integrate temperature/pressure/partial discharge sensors to realize real-time visualization of operating status.
- It supports communication protocols such as IEC 61850 and Modbus, enabling seamless connection with automation systems.
- The independently developed IEDS system by Xiamen Huadian allows remote monitoring of operating conditions.
- *User Value: Early warning and improved operation and maintenance efficiency.*

■ The table below lists the functional units available for Airing:

Functional Unit	Description
C	Load Break Switch Cabinet
D	Vacuum Circuit Breaker Cabinet

Switch	Description
LBS	Self-Energy Type Load Break Switch and Earthing Switch
VCB	Vacuum Circuit-Breaker with Three-Position Disconnector Switch
DS	Disconnector Switch
ES	Earthing Switch

■ The table below lists the types of scalable units available for Airing (with the capability of busbar side (horizontal) expansion):

Extensibility	Description
NE	Non-Extensible
DE	Double-Extensible
LE	Left Extensible
RE	Right Extensible

Each Airing switchgear can integrate 1 to 3 functional units. Specifically, the C functional unit has a width of 400 mm, and the D functional unit 450 mm; both can be flexibly installed at any position within the switchgear according to configuration requirements. Regardless of the installation position of the functional units inside the Airing switchgear, the principles for their installation, commissioning, operation and maintenance remain consistent. To simplify the content of this manual, subsequent chapters will only introduce the single-function functional units in Airing.

Technical Parameters (RMU)

Rating	Unit	Value
Rated Voltage	kV	24
Rated Frequency	Hz	50/60
Rated Continuous Current	A	630
Rated Short-Time Withstand Current	kA	20
Rated Duration of Short-Circuit	s	4
Rated Peak Withstand Current	kA	50/52
Internal Arc Classification,Arc Test Current I_A,Accessibility AFL or AFLR	kA	20
Internal Arc Classification, Test Duration t_A	s	1
Partial Discharge Tests A. Required Partial Discharge Quantity: Under 26.4 kV	pC	≤10
At 0 Gauge Pressure (abs.20℃) [0.10 MPa],Rated Short-Duration Power-Frequency Withstand Voltage (Phase to Phase & Phase to Earth, Across Load Break Switch Gap),IEC Standards.	kV	50/60
Rated Short-Duration Power-Frequency Withstand Voltage (Phase to Phase & Phase to Earth, Across Load Break Switch Gap)	kV	65/79
Rated Lightning Impulse Withstand Voltage (Phase to Phase & Phase to Earth, Across Load Break Switch Gap)	kV	125/145
Filling Level for Insulation and/or Switching (abs. 20℃)	Mpa	0.15
Minimum Functional Level for Insulation and/or Switching (abs.20℃)	Mpa	0.14
Tightness Test a. Annual Leakage Rate	%/Y	0.01
Loss of Service Continuity Category		LSC2
IP Coding , Gas-Filled Compartment		IP68
IP Coding , Enclosure		IP4X
IP Coding , Between Compartments		IP2X
IK Coding, Enclosure		IK08
Global Warming Potential (GWP) of Pure and Dry Air		GWP=0

C function: Two Position Load Break Puffer Switch and Separate Earthing Switch

Rating	Unit	Value
Rated Voltage	kV	24
Rated Frequency	Hz	50/60
Rated Continuous Current	A	630
Rated Short-Time Withstand Current	kA	20
Rated Duration of Short-Circuit	s	4
Electrical Endurance Class, Load Break Switch		E3, C2
Mechanical Endurance Class, Load Break Switch		M2
Electrical Endurance Class, Earthing Switch		E1/E2(1)
Mechanical Endurance Class, Earthing Switch		M1
Rated Cable Charging Current	A	50
Rated Line Charging Current	A	10
Rated Earth-Fault Breaking Current	A	63
Rated Cable- and Line-Charging Breaking Current under Earth-Fault	A	45
Operating Mechanism		Spring
Overall Dimensions:W×D×H mm		400*870*1950

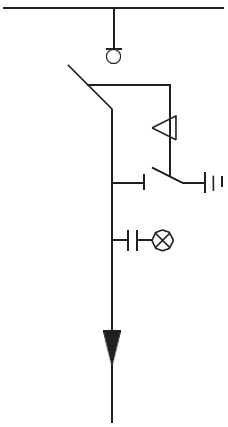
(1) Design Options

D function Vacuum Circuit-Breaker with Three-Position Disconnector Switch

Rating	Unit	Value
Rated Voltage	kV	24
Rated Frequency	Hz	50/60
Rated Continuous Current	A	630
Rated Short-Time Withstand Current	kA	20
Rated Duration of Short-Circuit	s	4
Electrical Endurance Class, Vacuum Circuit-Breaker		E3, C2
Mechanical Endurance Class, Earthing Switch		M2
Electrical Endurance Class, Earthing Switch		E1/E2(1)
Mechanical Endurance Class, Earthing Switch		M1
Mechanical Endurance Class, Disconnector		M1
Rated Line-Charging Breaking Current	A	10
Rated Cable-Charging Breaking Current	A	31.5
Rated First Pole-to-Clear Factor, Kpp:		1.3 and 1.5
Rated Operating Sequence		O–0.3s–CO–3min–CO, O-0.3s-CO-15s-CO(2)
Operating Mechanism		Spring
Overall Dimensions:W×D×H mm		450*870*1950

(1) Design Options
(2) Design Options

C function Two Position Load Break Puffer Switch and Separate Earthing Switch



Standard Configuration

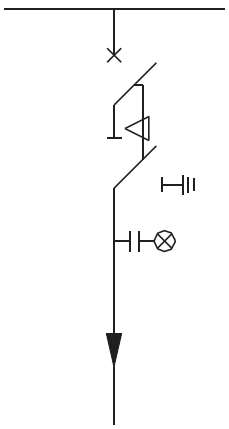
- Stainless steel gas-filled compartment
- Dual-station self-energy load break switch
- Manual operating mechanism for self-energy load break switch
- Earthing switch
- Manual operating mechanism for earthing switch
- Auxiliary contacts of load break switch (3NO+3NC)
- Auxiliary contacts of earthing switch (3NO+3NC)
- Mechanical interlock between load break switch and earthing switch
- Mechanical interlock between earthing switch and cable compartment
- Type-C 630A cable bushing with front horizontal arrangement
- Density gauge with auxiliary contacts (1NO+1NC)
- Live-line indicator (indicating live status of cable outlet bushing)
- Low-voltage compartment
- Cable compartment

Optional Configuration

- Electric operating mechanism for self-energy load break switch
- Busbar side expansion (DE, LE, RE)

Width: 400 mm
Depth: 870 mm
Height: 1950 mm

D function Vacuum Circuit-Breaker with Three-Position Disconnector Switch



Standard Configuration

- Stainless steel gas-filled compartment
- 630A vacuum circuit breaker
- Manual operating mechanism for vacuum circuit breaker
- Three-position isolation/earthing switch (line side)
- Manual operating mechanism for three-position disconnector /earthing switch
- Auxiliary contacts of vacuum circuit breaker (8NO+8NC)
- Auxiliary contacts of isolation/earthing switch (4NO+4NC)
- Mechanical interlock between vacuum circuit breaker and three-position switch
- Mechanical interlock between earthing switch and cable compartment
- Front horizontally arranged Type-C 630A cable bushing
- Density gauge with auxiliary contacts (1NO+1NC)
- Live-line indicator (indicating the electrification of cable outlet bushing)
- Low-voltage compartment, cable compartment

Optional Configuration

- Electric operating mechanism for VCB,
- Electric operating mechanism for DS and ES
- Closing coil
- Tripping coil
- Busbar side expansion (DE, LE, RE)
- Self Powered Relays for D- function
- Auxilliary Powered Relays for D- function

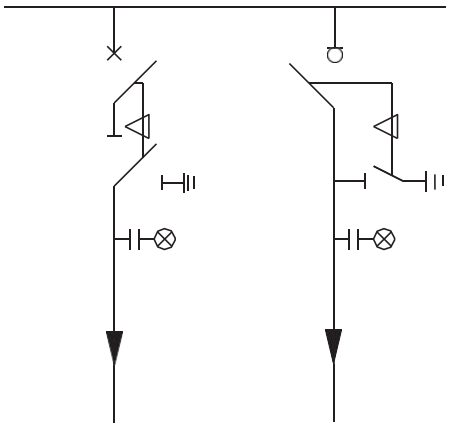
Width: 450 mm
Depth: 870 mm
Height: 1950 mm

DC Function

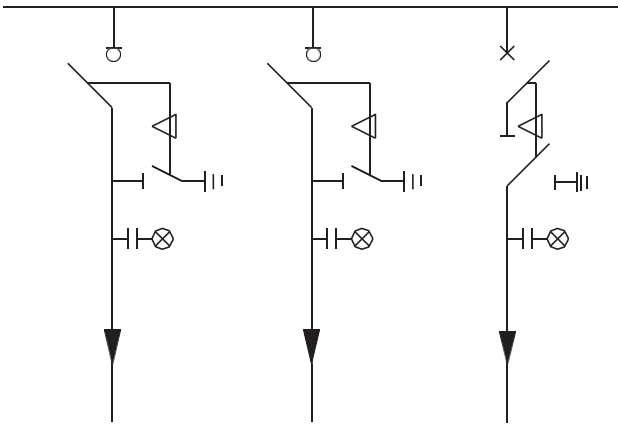
Standard Configuration
- Stainless Steel Gas-filled Compartment (Common Tank Type)
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details

Optional Configuration
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details
- Busbar side expansion (NE , DE, LE, RE)

Width: 850 mm
Depth: 870 mm
Height: 1950 mm



CCD Function



Standard Configuration
- Stainless Steel Gas-filled Compartment (Common Tank Type)
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details

Optional Configuration
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details
- Busbar side expansion (NE , DE, LE, RE)

Width: 1250 mm
Depth: 870 mm
Height: 1950 mm

Common Tank Type Functional Unit

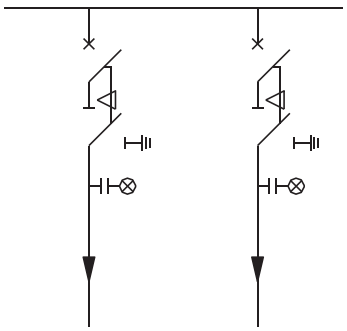
Standard Configuration

- Stainless Steel Gas-filled Compartment (Common Tank Type)
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details

Optional Configuration

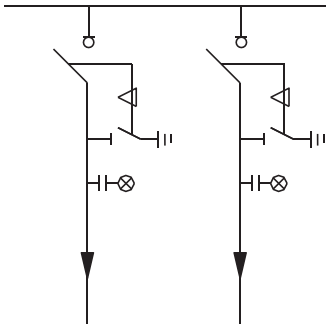
- Refer to the relevant descriptions of Functional Unit C and Functional Unit D for details
- Busbar side expansion (NE , DE, LE, RE)

DD Function



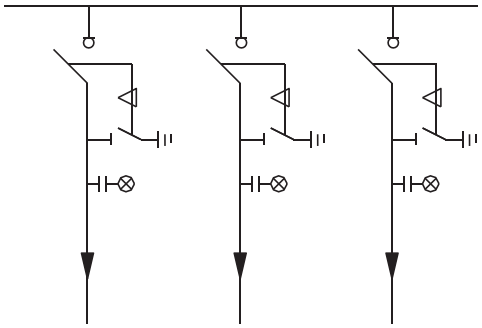
Width: 900 mm
Depth: 870 mm
Height: 1950 mm

CC Function



Width: 800 mm
Depth: 870 mm
Height: 1950 mm

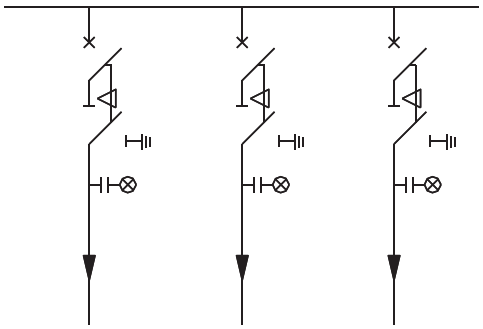
CCC Function



Width: 1200 mm
Depth: 870 mm
Height: 1950 mm

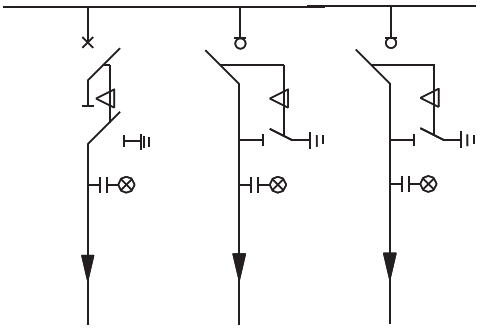
Common Tank Type Functiona Unit

DDD Function



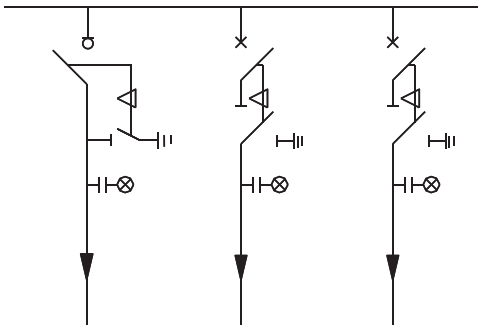
Width: 1350 mm
Depth: 870 mm
Height: 1950 mm

DCC Function



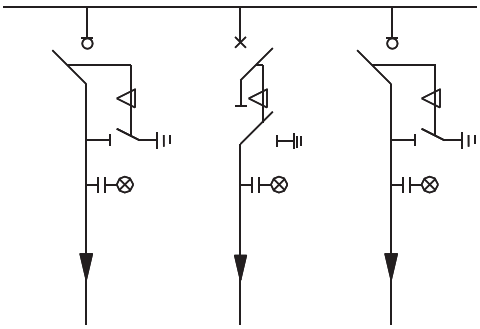
Width: 1250 mm
Depth: 870 mm
Height: 1950 mm

CDD Function

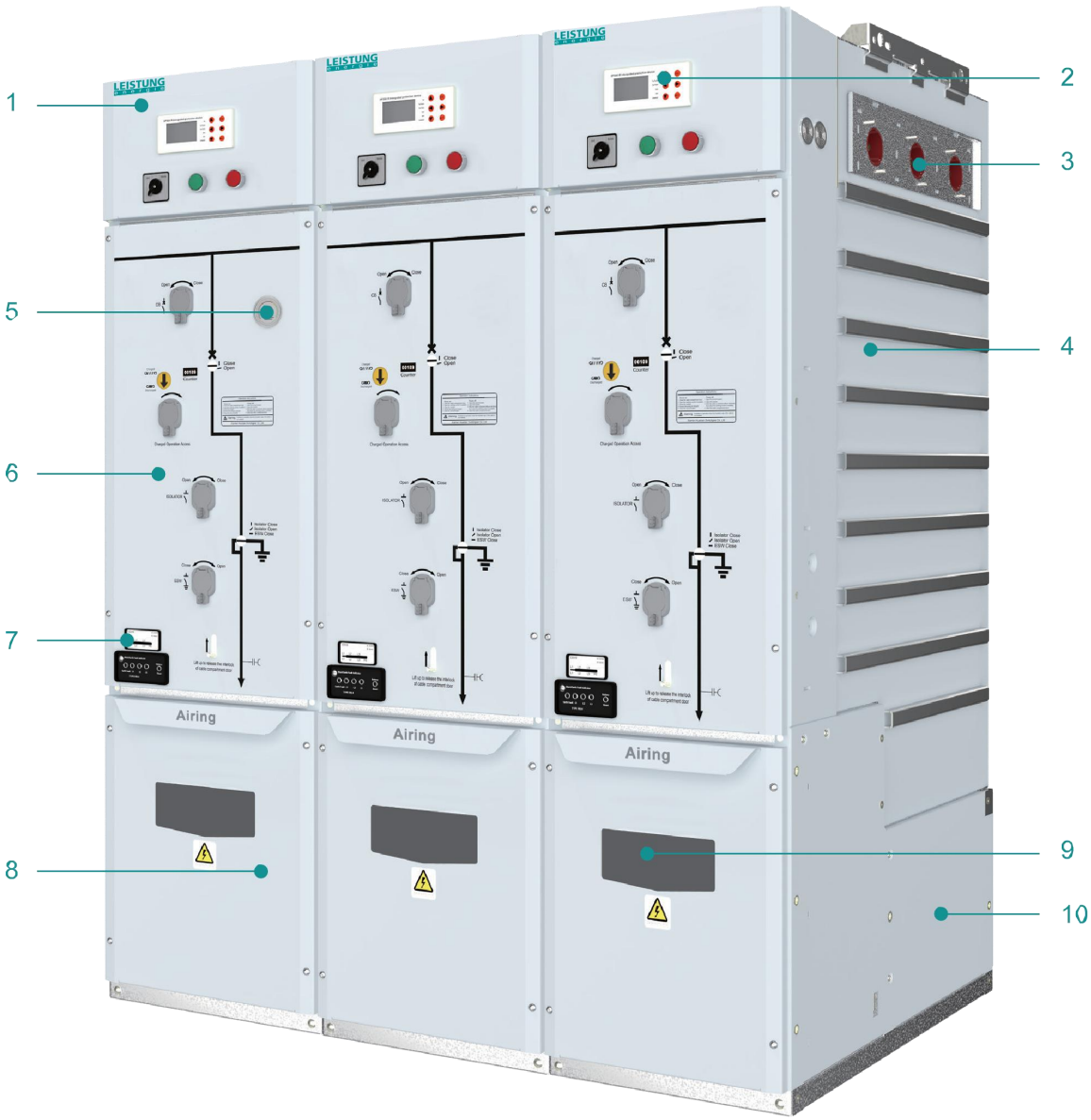


Width: 1300 mm
Depth: 870 mm
Height: 1950 mm

CDC Function



Width: 1250 mm
Depth: 870 mm
Height: 1950 mm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Airing
Airing
Airing

Product Structure

1 Low-Voltage Compartment

The low-voltage compartment (optional configuration) is available in three different heights: 250mm, 400mm, and is suitable for installing customer-customized secondary equipment.

2. Circuit Breaker Protection Relay

AP330 (optional configuration) is available in two types: self-powered protection relay and active protection relay. It can be installed in the low-voltage compartment or mechanism compartment.

3. Busbar Expansion and Modularization

- Busbar Expansion (optional configuration): plug-in bus coupler, eliminating the need for gas charging/ discharging operations during the expansion process
- Fully insulated and fully shielded busbar, unaffected by contamination and condensation
- Supports connection of different types of voltage detection devices

4. Gas-filled Compartment

Filled with clean, dry air and operating at a low absolute pressure of just 0.15 MPa, the switchgear delivers superior safety and reliability for long-term service.
Allows for the free installation of LBS and VCB.

5. Gas Density Gauge

Airing's sealed system is designed and tested to comply with IEC 62271-200, enabling the switchgear to achieve a service life of more than 30 years.

6. Operating Mechanism Compartment

The door panel layout of each functional mechanism compartment of Airing is compact and standardized, with clear switch position indicators and simple operation sequence instructions.

7. Live / Fault Indicator

Compatible with voltage detection systems and short-circuit/earth fault indicators provided by different manufacturers.

8. Cable Compartment

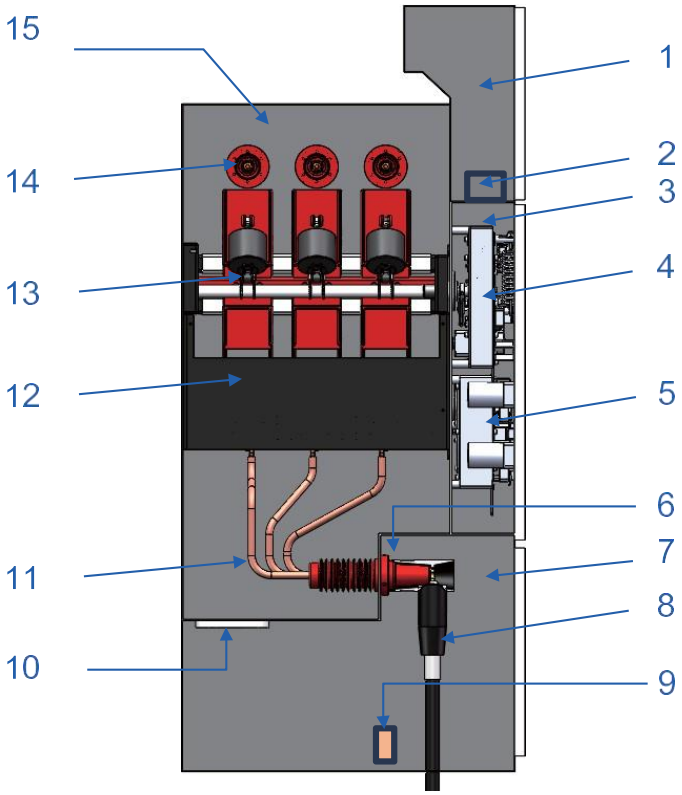
The bushings comply with DIN EN 50181 standard. Type-C Interface: Male Cone Structure + M16 Bolt Connection.
Connectable Equipment: Cable Elbow Connectors, Cable T-Connectors, CTs, PTs, Surge Arresters, etc.

9. Cable Compartment Viewing Window

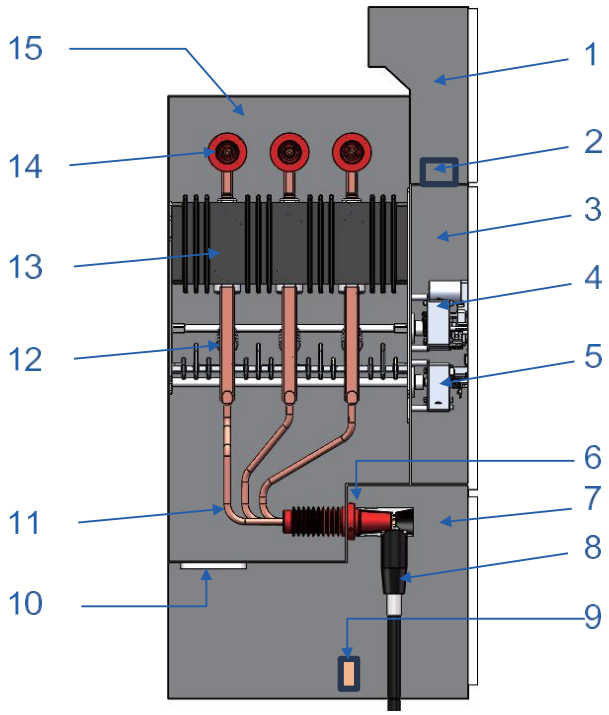
Cable compartment viewing window (optional configuration)

10. Pressure Relief Device

Standard downward pressure relief (standard configuration)
Optional backward-upward pressure relief (optional configuration)

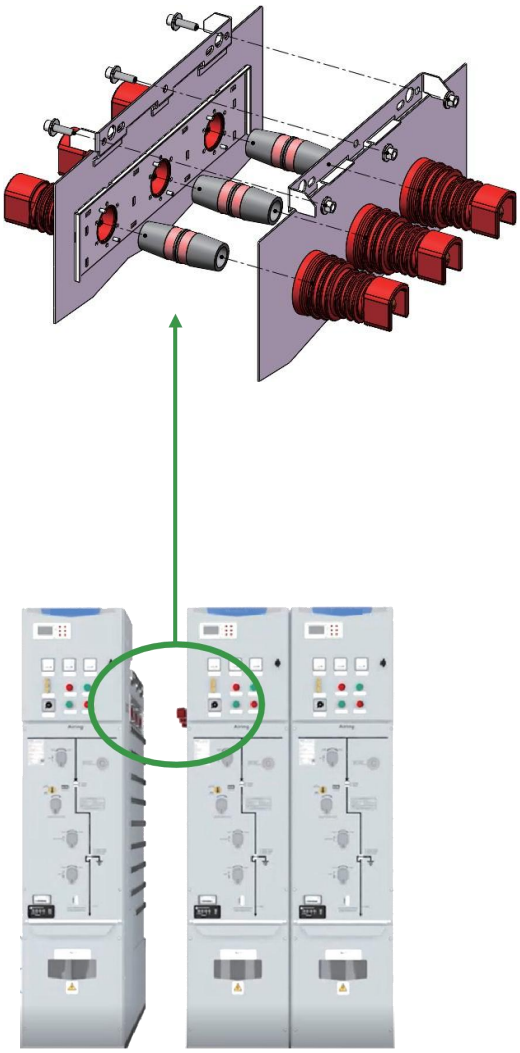


1. Low-Voltage Compartment
2. Removable cable trucking, for secondary cables and/or secondary small busbars
3. Operating Mechanism Compartment
4. VCB Operating Mechanism
5. Three-position DS and ES Operating Mechanism
6. Type-C Outlet Bushing (630A, M16)
7. Cable Compartment
8. Cable elbow connectors or cable T-connectors
9. Earthing Busbar with Earthing Connection
10. Pressure Relief Device
11. Branch Busbar
12. Three-position DS and ES
13. VCB
14. Main Busbar and Busbar Inner Cone Expansion
15. Gas-Filled Compartment



1. Low-Voltage Compartment
2. Removable cable trucking, for secondary cables and/or secondary small busbars
3. Operating Mechanism Compartment
4. LBS Operating Mechanism
5. ES Operating Mechanism
6. Type-C Outlet Bushing (630A, M16)
7. Cable Compartment
8. Cable elbow connectors or cable T-connectors
9. Earthing Busbar with Earthing Connection
10. Pressure Relief Device
11. Branch Busbar
12. ES
13. LBS
14. Main Busbar and Busbar Inner Cone Expansion
15. Gas-Filled Compartment

Busbar Extensibility



Features

• All unit cubicles and common-enclosure cubicles support busbar side expansion (optional configuration).
• Plug-in units, consisting of contact connectors and shielded silicone connectors.
• Unaffected by contamination and condensation
• No gas charging or discharging operations are required for the installation, expansion or replacement of the switchgear's cubicles.

All unit cubicles and common-enclosure cubicles can be configured with busbar inner cone bushings on the right side, left side or both sides. This design provides a high degree of flexibility for the configuration of the switchgear, allowing its functional units to be arranged in any order. No gas charging or discharging operations are needed during on-site installation and arrangement.

Arrangement Method as Follows:

• Realized via the busbar inner cones and busbar connectors on the sides of the gas-filled compartments Deviations between adjacent cubicles can be compensated by the limit fixing points and the movable busbar connectors with degrees of freedom in all axial directions.
• Reliable insulation and sealing are achieved through shielded busbar connectors. These busbar connectors adopt an external grounding design and can be adjusted according to deviations; when the cubicles are interconnected, the busbar connectors are compressed with a preset pressure.
• Insert shielded plugs into the free ends of the busbars. Each plug is compressed and fixed by a metal cover plate. A protective cover plate with warning signs is installed jointly above the three cover plates.
• Installation of the switchgear is simplified by positioning bolts, which also fix the relative positions of adjacent cubicles.

Bolt-type cubicle connectors with preset limits are used to ensure that the spacing between adjacent cubicles meets requirements and provide the required compression force for the busbar inner cone bushings and busbar connectors.

For the installation, expansion of the switchgear, or replacement of one or more functional units, the reserved operating space on the side of the cubicle is required to be ≥ 200 mm.

Cable Compartment

Cable Compartment

- The bushings comply with DIN EN 50181 standard. Type-C Interface: Male Cone Structure + M16 Bolt Connection
- Connectable Equipment: Cable Elbow Connectors, Cable T-Connectors, CTs, PTs, Surge Arresters, etc.

Cable Installation Precautions

When installing cables, please strictly follow the installation instructions provided by the cable manufacturer, and pay special attention to the following points:

- When cables enter the cable compartment of the switchgear from the cable trench, they must enter directly below the end face of the switchgear cable bushing (perpendicular to the cable compartment floor). This is to prevent the cable bushing of the switchgear from being subjected to torsional force caused by cable inclination.
- When crimping cable terminals, confirm that the terminal lapping surface is parallel to the lapping surface of the switchgear cable bushing, so as to ensure good electrical contact.
- When installing cable heads, ensure reliable contact between the terminal lapping surface and the cable bushing lapping surface (see Figure 1), and apply the correct torque.
- After the cable head installation is completed, the cables must be secured with cable clamps (see Figure 2 or Figure 3). This prevents unreliable lapping and air leakage at the cable bushing seal due to external forces.

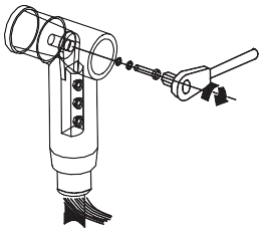


Fig. 1

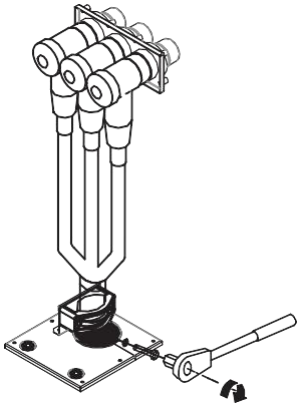


Fig. 2

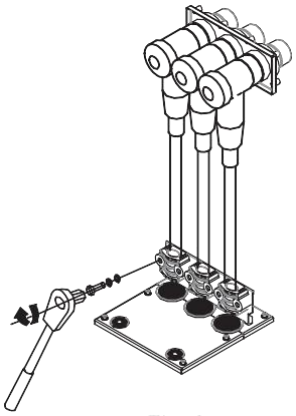


Fig. 3

Pressure Relief Direction

The following pressure relief system options are available for the Airing 24kV RMU:

Downward relief to the cable interlayer

(Applicable to both unit cubicles and common-enclosure cubicles. The maximum internal arc rating can reach IAC AFLR 20kA/1s. For the minimum cross-sectional dimensions of the cable interlayer, refer to the diagram below.)

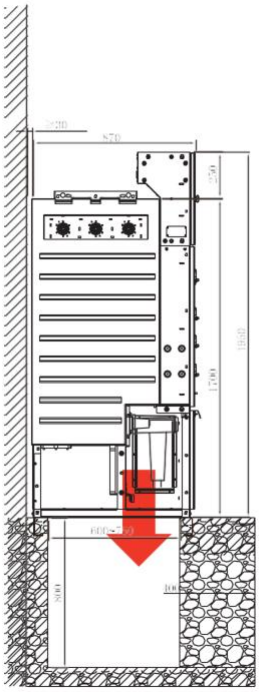
Upward relief via the underframe and rear pressure relief channel

(Applicable to both unit cubicles and common-enclosure cubicles. The maximum internal arc rating can reach IAC AFLR 20kA/1s. For the minimum indoor height requirement, refer to the table on the right.)

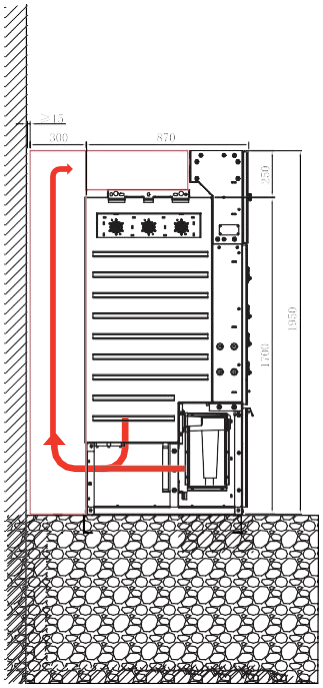
Minimum Indoor Height Requirement for Installation of RMUs with Rear Pressure Relief Channels

Type	Indoor Height Requirement
RMU without metering cabinet M	RMU height + 250 mm, and the total height shall not be less than 2300 mm
RMU with metering cabinet M	RMU height + 250 mm, and the total height shall not be less than 2500 mm

Downward Pressure Relief (Standard Configuration)



Pressure Relief Upward to the Top via the Pressure Relief Channel at the Rear of the Cabinet (Optional Configuration)



Overall Dimensions

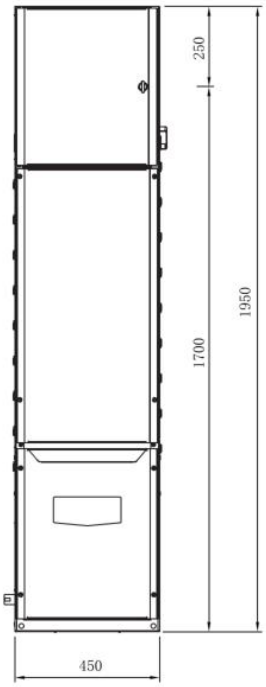
Airing 24kV Overall Dimensions

Features

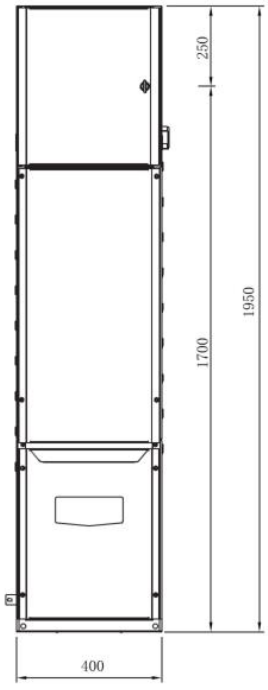
It features a compact structure that reduces its footprint significantly. Suitable for installation in both indoor and outdoor switchgear rooms, it facilitates on-site mounting, shortens construction schedules, and enhances overall economic efficiency.

Functional Units	Description	Width (mm)	Depth (mm)	Height (mm)
C	LBS Cabinet	400	870	1950(1700+250)(1)
D	VCB Cabinet	450	870	1950(1700+250)(1)

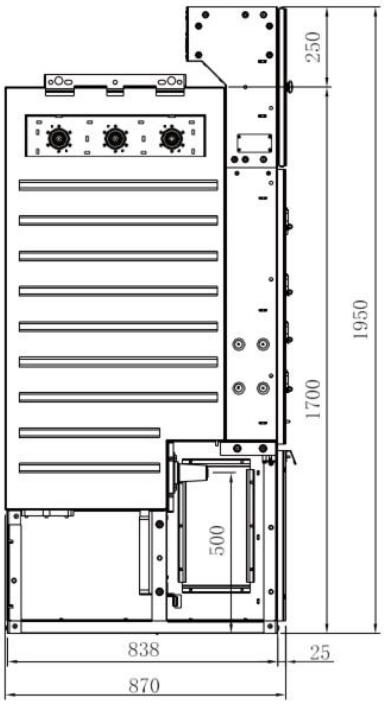
(1) Design Options



D Front View



C Front View



C / D Side View

Installation Diagram

Installation Diagram

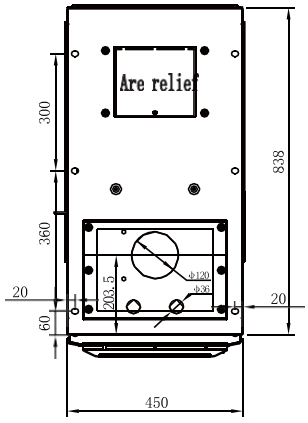
• For the embedding of the foundation frame, the secondary pouring method shall generally be adopted. The embedding work shall be carried out by the electrical installation unit after the completion of civil engineering construction. The fabrication of the foundation frame shall be executed in accordance with the drawings formulated by the design department based on the requirements of the manufacturer.

• During civil engineering design, the height of the channel steel for the foundation frame shall be taken into account for the switchgear foundation, with a slight margin reserved.

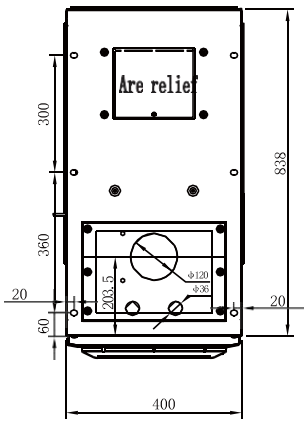
• The foundation frame is fabricated by welding channel steel and angle steel. There are no strict requirements for the height of the channel steel, which can be selected according to the actual load-bearing capacity. The extension distance of the foundation frame shall be consistent with the size of the switchgear body frame (excluding the front door panel), with a specified value of 600 ~ 750 mm. The total length of the frame shall be determined by the layout of the switchgear and the number of switchgear units per row.

• Level calibration must be conducted during the pre-embedding of the foundation frame, with the requirement that the level error shall not exceed 1 mm per meter and the total error shall not exceed 2 mm.

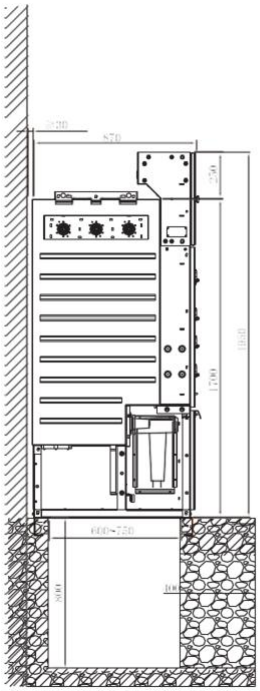
• Channel steel for fixing the switchgear shall be arranged at the intervals between two adjacent units (including the PT cabinet). For specific details, refer to the layout plan.

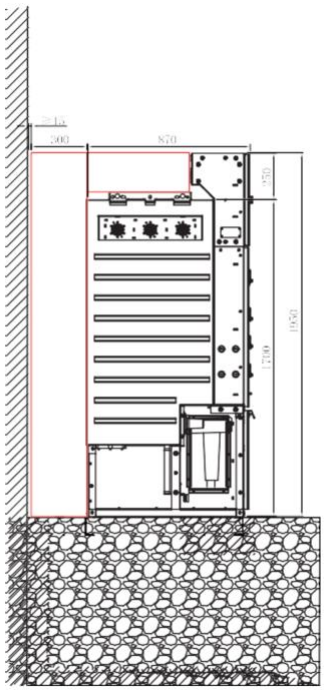


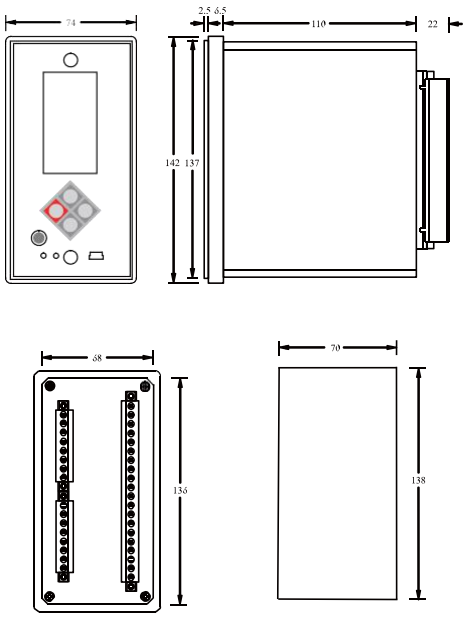
D View



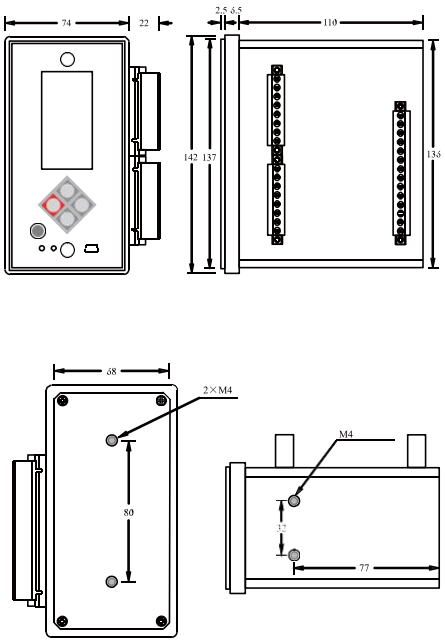
C View







Rear Terminal Wiring Mode



Terminal-Side Wiring Mode

AP310 Self-Powered Relay

Designed specifically for the application of ring main units, it can operate by drawing power from CT especially when there is no external power supply or voltage available for power extraction. It is equipped with complete current protection, switch input (programmable for output tripping or alarming), relay output and communication functions.

- The device adopts a highly integrated microprocessor with on-chip bus to process signals from voltage and current transformers, and controls the output of the device through digital logic operations. With a sealed chassis and maintenance-free design, it features excellent anti-interference performance, making it ideal for ring main unit systems with harsh operating environments and limited installation space.
- The whole device adopts ultra-low power consumption design technology to ensure the reliable and rapid activation of protection functions under any conditions.
- Self-powered function (powered by current transformers), eliminating the additional burden caused by the installation of DC panels or UPS.
- The power input allows mixed voltage input, which can be connected to the power supply winding of current transformers, as well as DC24V or DC48V voltage.
- Flexible and comprehensive protection configuration, various protection functions can be freely enabled or disabled through control words.
- It is equipped with three-stage phase overcurrent protection, two-stage zero-sequence (earth-fault) current protection, and a variety of IEC standard inverse time-delay curves. It also has inrush current blocking function to avoid switch mis-tripping caused by transformer no-load closing.
- The instantaneous overcurrent protection adopts a fast algorithm with short data window to ensure quick removal of short-circuit faults and avoid overstep tripping.
- Selectable Chinese and English menus, with pop-up window design for event alarms, delivering an extremely user-friendly human-machine interface.
- The current measurement circuit is designed with automatic dynamic gain, giving the device an extremely wide measurement range that can simultaneously match current transformers with a secondary rating of 1A or 5A.
- 50Hz and 60Hz systems can be user-defined, and the zero-sequence current acquisition method is selectable (external input or internal calculation).
- The device records 255 historical event records, with data retained even when powered off, facilitating post-fault investigation.
- The device is provided with an RS-485 communication interface and offers an open communication protocol to users, enabling SCADA functions.

Order Information

- Model, name and scheme of RMU
- Rated voltage, rated current and required quantity
- Manual operation mechanism or electric operation mechanism, and indicate the voltage for electric operation
- Name and quantity of spare parts
- Other special requirements shall be put forward before ordering

Accompanying Documents and Attachments

- Certificate of Conformity (factory test report)
- Operation Manual
- Packing List
- Operation Handle

United Kingdom | Australia | China | Chile | Germany |
Hongkong | Indonesia | Malaysia | Russia | Singapore |
South Africa | Thailand | Vietnam |

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