ONA Electric Industries

The Future Is Your's

ON Series

ECONA 1

Medium voltage
Vacuum circuit breaker

Discover the **VCB** that's right for your needs

Engineered for reliability & performance

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Introduction

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0.1 Introduction

A Reliable Medium-voltage Vacuum Circuit Breaker

The ECONA type indoor medium-voltage vacuum circuit breaker is designed for12KV/24KV power systems, offering reliable switching for industrial and power grid applications.
It features a robust, maintenance-free design with a new operating mechanism and solid seal pole technology. The breaker is built to handle various loads and frequent operation, including multiple short-circuit scenarios, while reducing maintenance costs and enhancing environmental adaptability.

Applicable Standards

02

02. Applicable Standards

Our **ECONA** is designed and manufactured to the highest standards of quality and performance.
With its exceptional performance, you can trust it to deliver reliable and efficient protection for your critical electrical systems.

E2 & M2 Standards

The ECONA is designed with the highest standards of energy efficiency, adhering to both the E2 and M2 standards.

E2 Compliance

The ECONA meets the stringent requirements of the ETSI ES 202 706 E2 standard. This ensures optimal energy consumption, significantly reducing the environmental footprint while delivering top-tier performance and reliability.

M2 Compliance

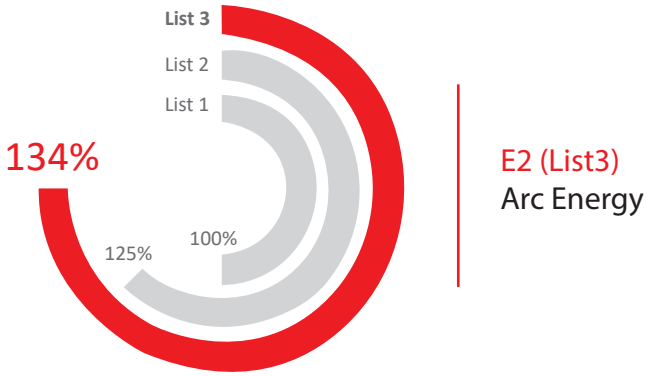
Additionally, our ECONA is complying with the M2 standard by the International Telecommunication Union (ITU). This certification guarantees that our product operates at peak energy efficiency, promoting sustainability and cost-effectiveness in electrical distribution systems.

By adhering to these standards, our ECONA provide superior durability, safety, and efficiency in various applications, from industrial settings to power distribution networks.

02. Applicable Standards

Electrical Endurance Rating：E2 (List3)

The E2 grade, the highest electrical endurance level specified in IEC 62271-100, includes three test categories: List 1, List 2, and List 3. While List 1 is generally recommended, List 3, introduced in 2008, has fewer breaking operations for T10 and T30 but significantly longer T60 test durations. This results in a harsher test environment, with arc energy levels at 100% for List 1, 125% for List 2, and 134% for List 3..



Mechanical Endurance Rating：M2

The IEC standard defines mechanical endurance ratings to guide customers in selecting products based on performance and quality levels. Our HG-Series vacuum circuit breaker adheres to the more stringent M2 mechanical endurance standard.

Environmental Conditions

03

03. Environmental Conditions

Ambient temperature

Maximum temperature: +40℃
Minimum temperature: -15 ℃

Ambient Humidity

Daily average relative humidity: ≤95%
Monthly average relative humidity: ≤90%
Daily average vapor pressure: ≤2.2×10 MPa
Monthly average vapor pressure: ≤1.8×10 MPa

Altitude

No more than 1000m

Seismic intensity

Does not exceed 8 degrees

Surroinding air

Not significantly contaminated by dust, smoke, corrosive and/or flammable gases, vapors or salt spray.

Note

If you exceed the requirements of the above normal environmental conditions, you need to negotiate with the manufacturer.

Key Specifications & Model Designation

04

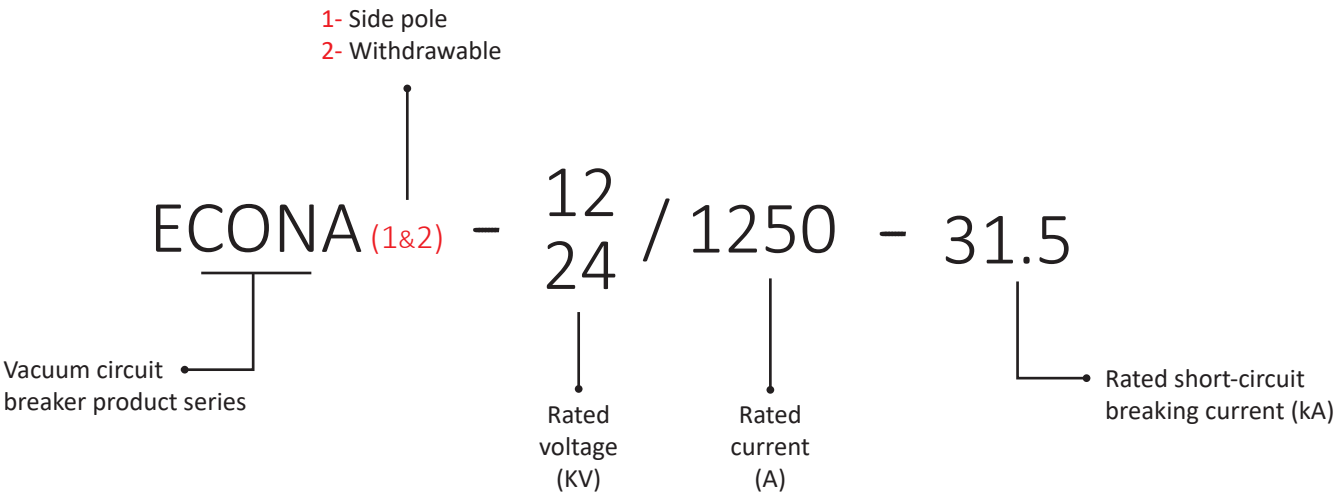
04. Key Specifications & Model Designation

Item	Unit	Parameters
Rated voltage	kv	12, 24
Rated short-time power frequency withstand voltage (1 min)		65
Rated lightning impulse withstand voltage (peak)		125
Rated frequency	HZ	50
Rated current	A	630 - 1250
Rated short-circuit breaking current	KA	25 31.5
Rated short-time withstand current		25 31.5
Rated short circuit duration	S	3
Rated peak withstand current	KA	63 80
Rated short-circuit closing current		63 80
Secondary circuit power frequency withstand voltage (1 min)	V	2000
Rated single/back-to-back capacitor bank breaking current	A	630 / 400
Opening time	ms	20 ~ 50
Closing time		35 ~ 70
Mechanical life	Times	M 2 level 10000 (1250/25 630 ~ ~ 31.5
Electrical life		E2 Class
Allowable wear accumulative thickness of dynamic and static contacts	mm	3
Rated closing operating voltage	V	AC 110, AC220 DC110, DC220
Rated opening operating voltage		
Rated voltage of energy storage motor		
Rated power of energy storage motor	W	90
Energy storage time	S	≤15
Contact opening distance	mm	12 ± 1
Overtravel		3 ± 1

04. Key Specifications & Model Designation

Item	Unit	Parameters
Contact closing bounce time	ms	≤2
Three phase division and closing are different		≤2
Average opening speed	m/s	Contact rigid minutes~6mm 0.9 ~ 1.7 0.9 ~ 1.7
Average closing speed		6mm~ contacts just fit 0.6~1.0 0.6~1.0
Opening rebound amplitude	mm	3 or less
Main circuit resistance	μΩ	≤45(630 ≤35(1250A)
Contact closing contact pressure	N	2500 ~ 3500
Rated operating sequence		O-0.3s-CO-180s-CO
Standard		IEC 62271-100

Model designation



Design & Operating Principle

05

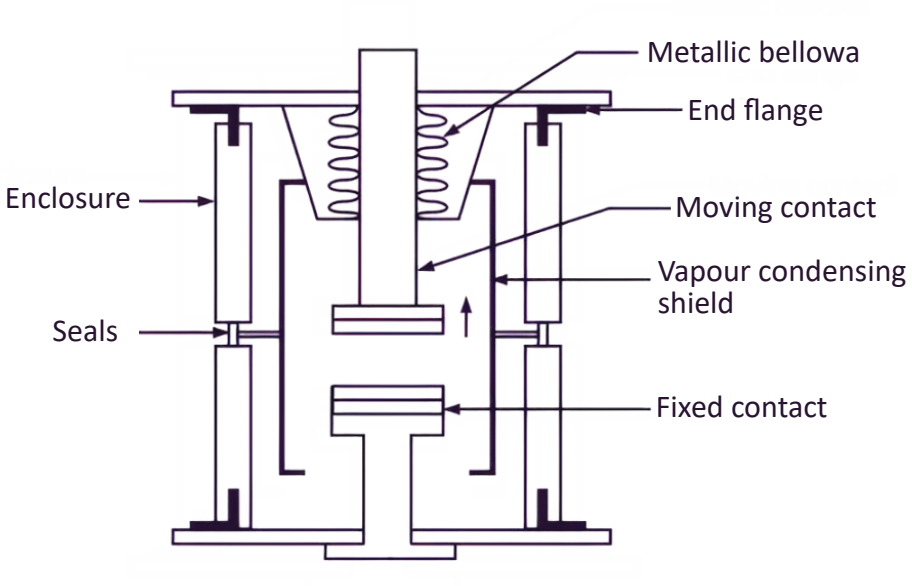
05. Design & Operating Principle

Design and Dimensions

Modular Design for Harsh Environments

The ECONA 1 features a modular construction with a segregated operating mechanism, enhancing maintainability. Its three-phase, floor-mounted primary circuit optimizes space usage.

For reliable operation in harsh environments, ECONA 1 employs an epoxy resin sealing process (APG). This process creates a dust-tight seal around the critical vacuum arc extinguishing chamber, preventing contamination and ensuring reliable performance in hot, humid, and dirty environments.



05. Design & Operating Principle

Operating Mechanism and Arc Interruption

Modular Spring-Energy Operated Mechanism

The operating mechanism is a modular spring energy storage operating mechanism, and the operating mechanism is integrated with a closing unit, an opening unit composed of one or several overcurrent trip electromagnets, an auxiliary switch, an indicating device and other components; The front is equipped with closing and parting buttons, manual energy storage handle, spring energy storage status indicator, closing and parting indicator, etc.

Effortless Closing and Controlled Opening

Energy for closing the breaker is stored in a spring using either a motor or a manual handle. When released, this stored energy drives the contacts into the closed position. The breaker can be tripped remotely or manually, and after opening, a hydraulic buffer ensures a smooth separation of the contacts. Visual and electrical indicators confirm the breaker's state throughout operation.

Built-in Safety Features

The mechanism incorporates safety features to prevent accidental closing under specific conditions, ensuring secure and reliable operation.

05. Design & Operating Principle

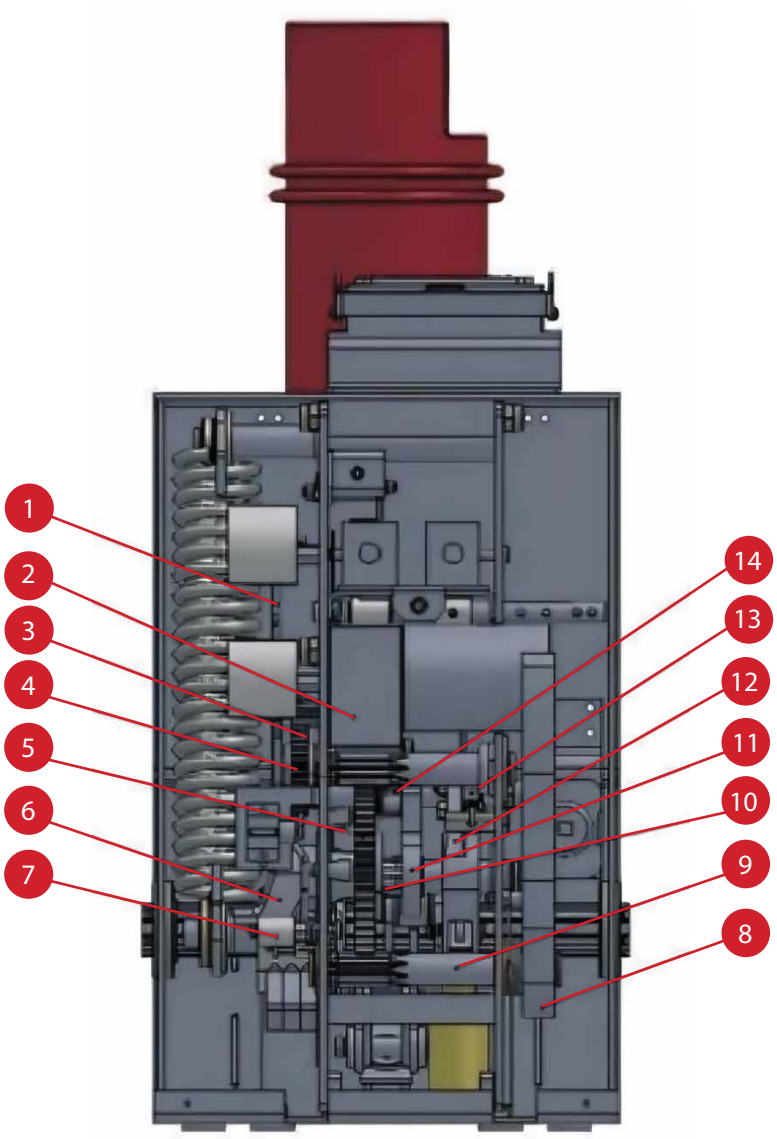


Figure 1

1. Connecting rod
2. Energy storage motor
3. First stage gear
4. Two-stage tooth wheel shaft
5. Two-stage gear
6. Energy storage shaft
7. Connected plate
8. Energy storage handle
9. Gear shaft
11. Overrunning clutch
12. Convex wheel
13. Holding mechanism
14. Closing to hold the engine
15. The energy storage keeps the key

05. Design & Operating Principle

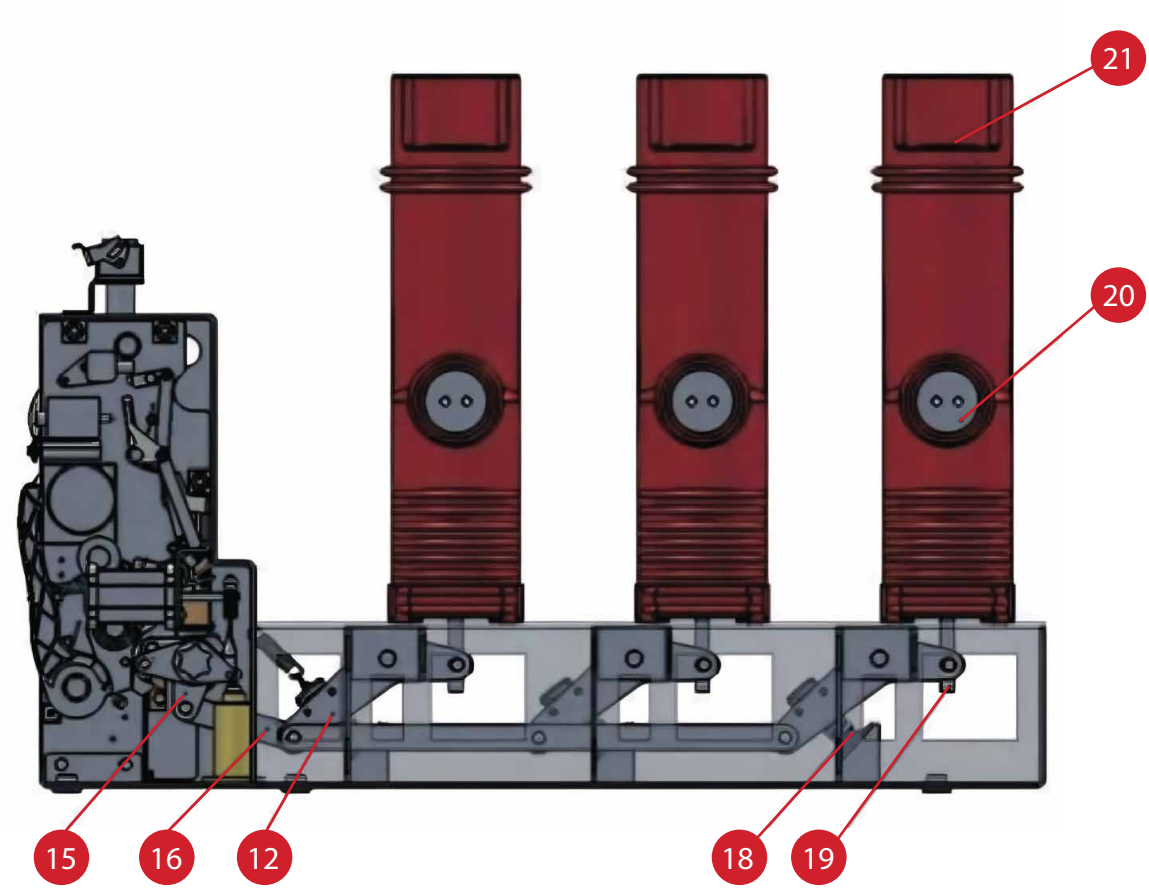


Figure 2

15. Arm lever
16. Arm lever
17. Lever arm
18. Brake spring
19. Insulation rod
20. Lower cable seat
21. Upper exit seat

05. Design & Operating Principle

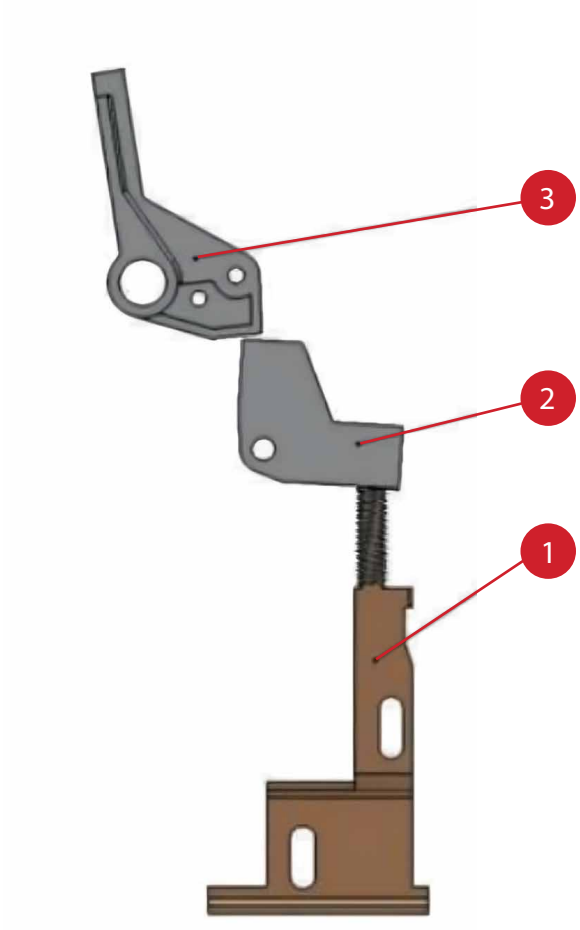
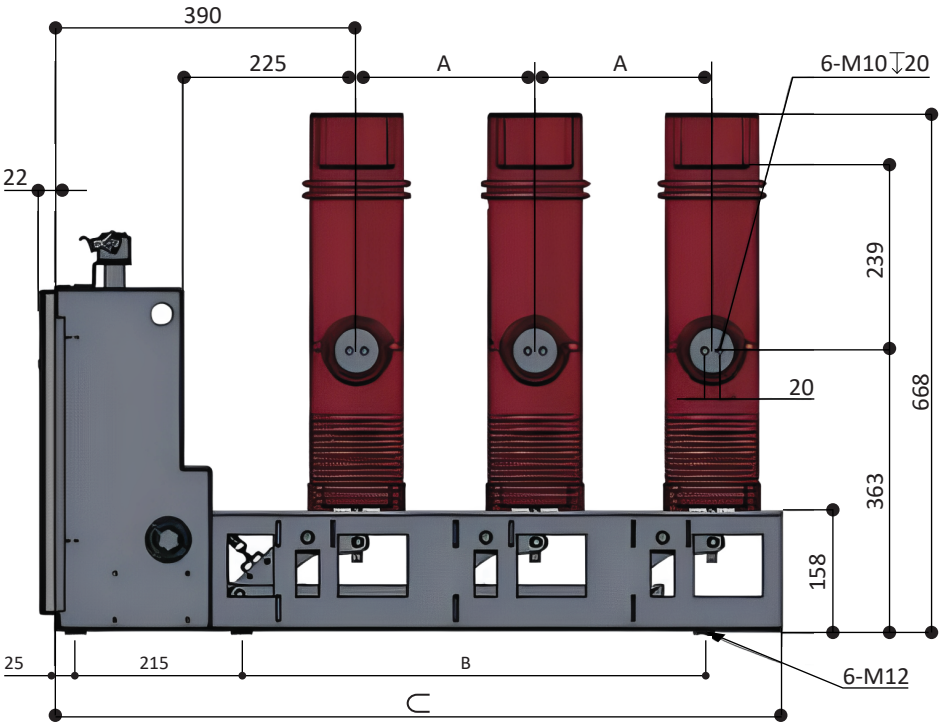


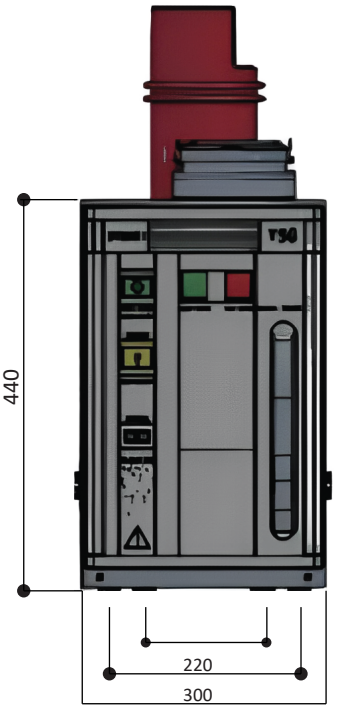
Figure 3

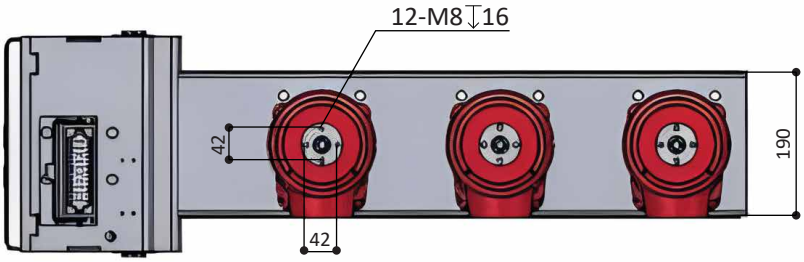
1. Closing interlock bending plate
2. Closing and interlocking plastic parts
3. Closing plastic parts

05. Design & Operating Principle

Solid seal pole dimensions







A	B	C
210	550	901
230	600	941
275	650	1031

05. Design & Operating Principle

Anti-Misoperation Interlocks

The circuit breaker can provide perfect anti-misoperation function.

(See Figure 3 and Figure 4)

Note

The closing and locking device (if selected) has a low power consumption of 3.2W and operates within a wide voltage range (0.65 to 1.1 times the rated voltage).

Prevents Reclosing After Closing

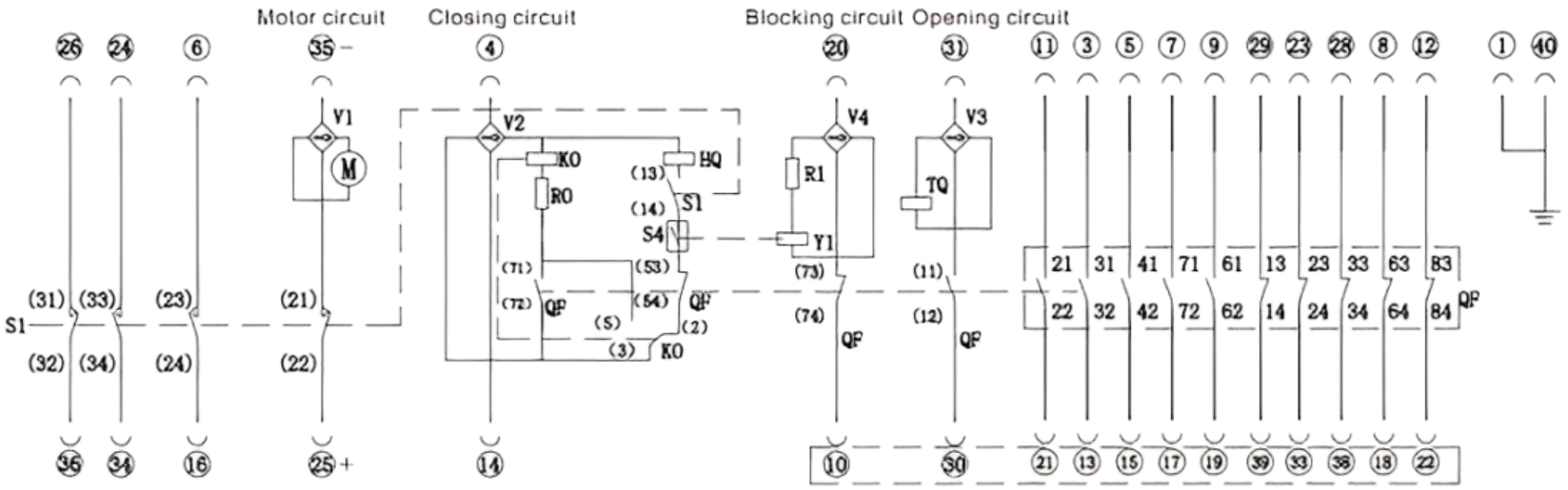
A mechanical interlock (Figure 3) prevents accidental reclosing after a closing operation. Once closed, the mechanism physically restricts the breaker from reclosing until it's been opened.

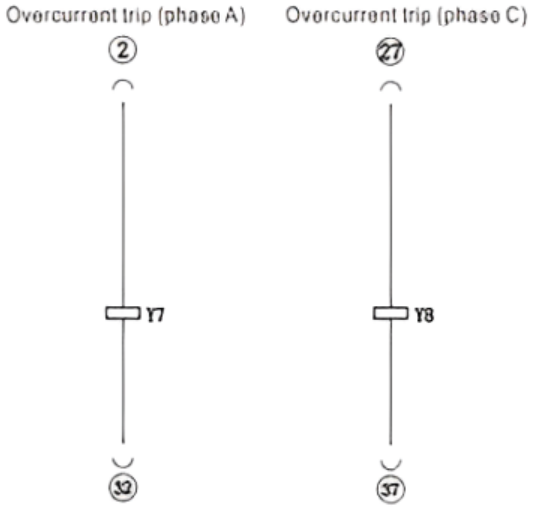
Prevents Multiple Reclosures

An electronic control circuit (internal) safeguards against multiple reclosures by automatically cutting off the closing circuit if the closing electrical signal persists after closing (Figure 4).

Prevents Closing with Locking Device

For added safety, an optional electric closing lock can be selected. This lock prevents closing until it's manually unlocked, ensuring proper sequence of operations





Note: When the DC power supply is operated, the polarity in the dotted box should be the same, and the motor should be connected according to the polarity diagram as shown in the diagram that VS1 is in the switching state without energy storage.
S4: Lock solenoid auxiliary switch (normally open)
HQ: Closing coil
KO: Anti-jump relay (optional)
S1: micro switch (switch after closing spring)
TQ: switching coil
Y1: latching coil (optional)
QF: auxiliary switch (switch during tap-closing operation)
M: energy storage motor
V1-V4: Bridge rectifier (optional)
R0-R2: indicates a resistance
Y7-Y8: Indirect overcurrent release coil (optional)

ECONAI-12/300 side mount internal wiring diagram

Installation & commissioning

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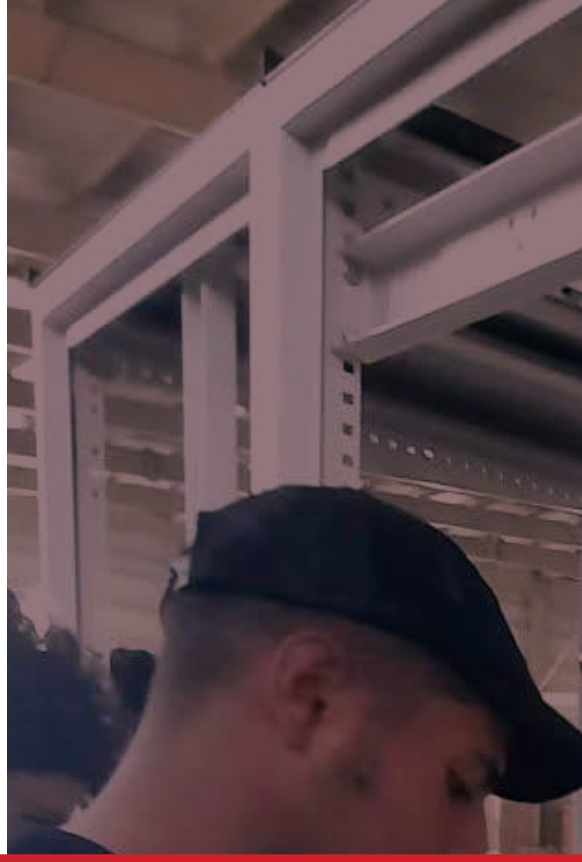
06. Installation & commissioning



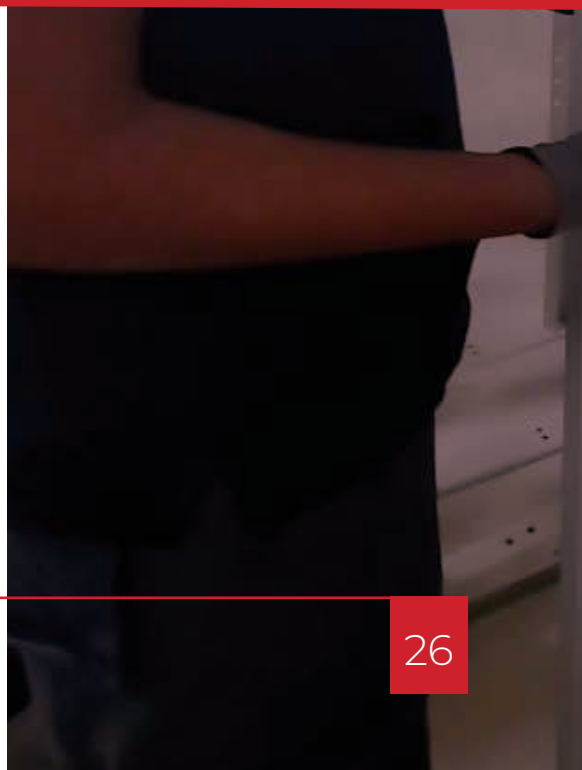
Unpacking and Handling

Careful Handling

Utilize the designated lifting points on the circuit breaker to avoid damage during unpacking. Exercise caution to prevent shock or vibration to the upper and lower outlet arms.

Remove Lifting Device

Before proceeding, ensure the lifting device is completely removed.



Note

Please remove the lifting device as required before the formal loading operation.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06. Installation & Commissioning

Pre-Installation Inspection

1. Thorough Inspection

Conduct a comprehensive inspection for any damage to the circuit breaker. If damage is detected, discontinue installation.

2. Cleaning

Remove dirt and contaminants, especially from insulation surfaces. This is crucial for maintaining optimal insulation performance.

3. Manual Operation Check

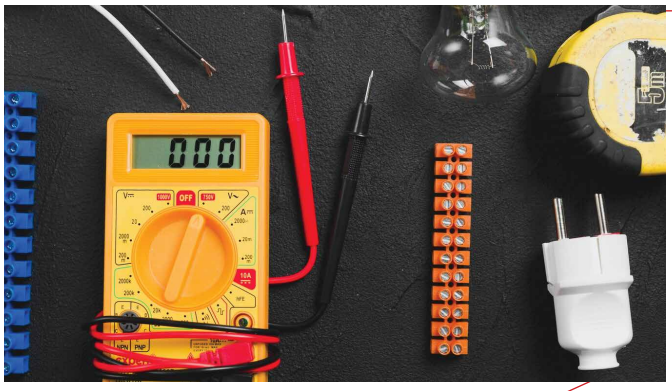
Conduct a comprehensive inspection for any damage to the circuit breaker. If damage is detected, discontinue installation.

4. Powered Operation Check

Conduct a comprehensive inspection for any damage to the circuit breaker. If damage is detected, discontinue installation.

5. Power Frequency Voltage Insulation Test

Conduct a comprehensive inspection for any damage to the circuit breaker. If damage is detected, discontinue installation.



06. Installation & Commissioning

Symptom	Cause
Can't close	1. The system is not in the storage state
	2. The switch is on
	3. The closing and locking device is selected, and the auxiliary power supply is not connected or lower than the technical requirements
	4. The secondary line is inaccurate

After checking for the above reasons, please contact the manufacturer if you still have questions.

Maintenance & Inspection

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07. Maintenance & Inspection

Low Maintenance Design

Our vacuum circuit breakers feature a robust design incorporating special sliding bearings, advanced rust prevention coatings, and long-lasting grease. Under normal operating conditions, minimal maintenance is required for up to 20 years.

Routine Inspection and Cleaning

Regular inspection is recommended to ensure optimal performance, especially in challenging environments.

Visual Inspection

Conduct a visual inspection every 6-12 months to assess the circuit breaker's overall condition.

Cleaning

Gently clean the circuit breaker's exterior using a soft cloth. For stubborn dirt, use a mild cleaning agent suitable for plastics. Avoid harsh chemicals.

07. Maintenance & Inspection

Preventative Exercise

To maintain optimal performance, perform at least five energy storage, closing, and opening cycles per year for circuit breakers in extended idle periods.

Operational Limits

Adhere to the specified number of operations to prolong the circuit breaker's lifespan. Exceeding operational limits may compromise performance and safety.

Insulation Testing

Regular insulation testing is essential to verify the integrity of the vacuum arc extinguishing chamber. Conduct this test annually.

Configuration

08

Configure your VCB with precision for optimal performance and safety

08. Configuration

1. Secondary control voltage

DC220V AC220V DC110V AC110V

2. Optional control features

9.2.1 Locking device

Prevents accidental closing if control power is off or insufficient.

9.2.2 Overcurrent device

Protects against overload and short circuit.

- Activates when overload or short circuit occurs.
- Typically installed on A and C phases, but can be used on all three phases.
- Uses either indirect or intermediate transformer based on current transformer capacity.
- Indirect overcurrent trip options: 3.5A and 5A.
- Intermediate transformer wiring diagram:

Y5 -> overcurrent trip electromagnet
ZT -> intermediate transformer
CT -> Current Transformer (primary component)
GL1-3 -> Overcurrent relay
C -> capacitance

08. Configuration

3. Electrical Parameters of secondary components

Operating voltage 220V

	Closing electromagnet	Opening electromagnet	Blocking electromagnet	Anti-jump relay
Loop current	1.0 A	0.9 A	29 mA	29 mA
Work rate (W)	220	198	3.2	3.2

Operating voltage 220V

	Closing electromagnet	Opening electromagnet	Blocking electromagnet	Anti-jump relay
Loop current	2.75 A	2.75 A	29 mA	9.1 mA
Work rate (W)	302.5	302.5	3.2	1.0

1. The fault maintenance of the circuit breaker should be carried out by professionally trained personnel or service personnel of the manufacturer to make correct adjustments Work.
2. The vacuum break of the circuit breaker shall not be used for isolating the break for a long time

Note

The anti-jump device prevents multiple reclosings of the circuit breaker by cutting off the closing circuit if the closing signal is not removed in time after the circuit breaker is closed. If a comprehensive protection device is used, it should be checked whether the anti-jump device needs to be installed.

Note

In order to prevent accidents, when greasing the operating mechanism and other work, should be carried out in the state of no energy storage.

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Ona Electric Industries

5-Year Warranty Commitment

At Ona Electric Industries, we believe in the quality and durability of our products. That's why we offer a comprehensive 5-Year Warranty on all our electrical solutions, including our switchgear, transformers, smart grids, and more.

Benefits of Choosing Ona Electric:

-Long-Term Reliability: Trust in the longevity of your electrical systems.
-Top-Tier Support: Our dedicated support team is always here to assist.
-No Additional Costs: Enjoy full coverage without hidden fees.