CES-40.5
Cooper Edision™ Vacuum circuit breaker
special for Capacitors switching

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SERIES

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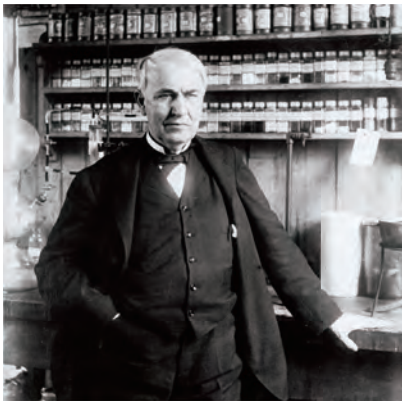
CES-40.5

Cooper Edision™ Vacuum circuit breaker special for Capacitors switching

Overview

CES-40.5, vacuum circuit breaker special for capacitor's switching, is a new-generation dedicated medium voltage switch equipment developed by Thomas Edison R & D Center of Cooper according to the characteristics of current power grid load demands, which can provide a stable and reliable solution for the switching of 35kV voltage side reactive compensation capacitor bank of 500kV, 330kV and 220kV transformer substations.

CES-40.5 employs the latest dual-break vacuum arc extinguishing technology. This vacuum technology has the characteristics of excellent electrical insulating property, cleanness, no pollution, and long life. The dual-break technology can significantly improve the switching ability of capacitor bank of vacuum circuit breaker.



Product feature

- Employ the precisely controlled dual-break vacuum arc extinguishing technology
- High-performance EATON vacuum interrupter
- Outdoor solid embedded insulating technology from years of experience of Copper in USA
- IV artificial pollution grade
- Bistable permanent magnetic mechanism with quick opening function

Structural feature

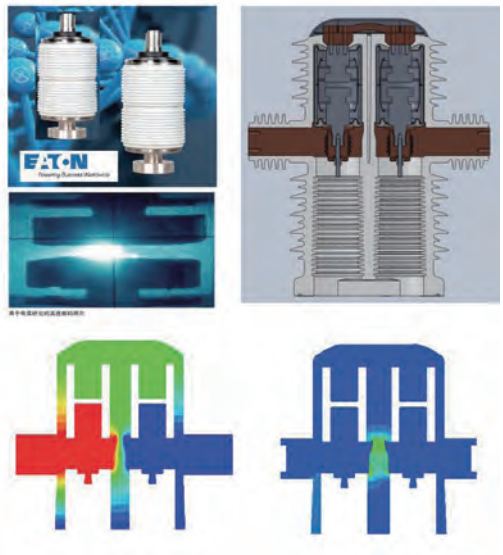
- Anti-rust surface treatment for outdoor epoxy coating
- Patented " π " type efficient diversion trench waterproofing system
- The double-door design ensures the on-site installation and debugging more convenient and reliable
- The height adjustable support is seamlessly fit and connected with the customer system
- The patented manual energy storing spring operating mechanism ensures emergency opening operation without power

Technical innovation

Precisely controlled dual-break making and breaking technology

- Special contact material. WCuX material is used for making the inrush current and resisting fusion welding, and CuCrX material is used for breaking the short-circuit current of system.
- The specially designed slotless contact generates superstrong bipolar longitudinal magnetic field, preventing fully constricted arc and reducing contact fusion.
- Dual-break resists the TRV, ensuring extra-low reignition probability.

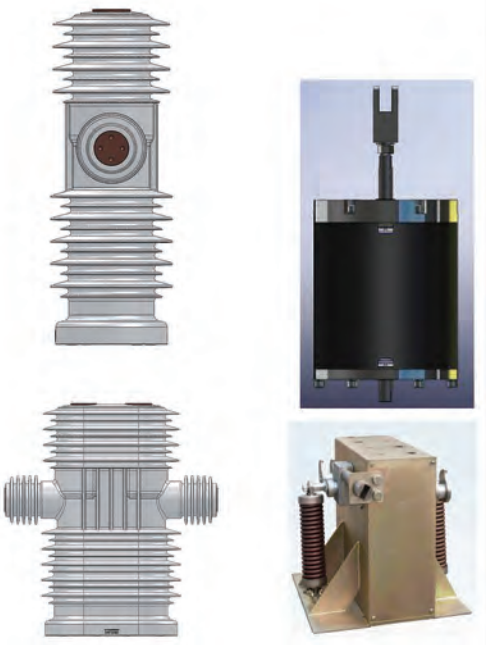
WCuX material is a new composite material consisting of W, Cu and other elements, which is distributed evenly, and does not become solid solution or form chemical compound. The material has high melting point, high density, high-temperature strength, electric corrosion resistance and fusion welding resistance of W, and high conductivity, thermal conductivity and workability of Cu. Cu may evaporate to absorb much arc energy at the high temperature of arc to reduce the arc temperature, and achieve the functions of strengthening the arc extinguishing effect and reducing the electric corrosion together with other microelements.



Cooper's mature technology of outdoor solid embedded pole and permanent magnetic mechanism

- Highly reliable production technique of solid embedded pole, high-performance HCEP insulating material, and stable insulating property.
- Self-lubricating reliable outdoor dedicated permanent magnetic mechanism with low energy consumption, and resistance to pollution and rust.
- Advanced and reliable production line and quality management system.
- Good weatherability, IV artificial pollution grade, and suitable for the ambient temperature of -40°C~40°C.

The pole technology of CES outdoor vacuum breaker is introduced from the Cooper's outdoor middle-high voltage field in USA, adhering to its design and manufacturing advantages for more than 40 years, and having very good insulating property. The dedicated EMD permanent magnetic mechanism employs the mature bistable technology, and the limit positions for opening and closing are maintained by the magnetic force provided by permanent magnet. When the excitation power generated by electric coil exceeds the magnetic holding power, the opening and closing operations can be achieved. The EMD mechanism can conduct an electrical operation for opening or closing even within 200s of loss of power, and the emergency opening system can achieve the emergency opening action of mechanism after complete loss of power.



Technical innovation

Advanced HCEP material

- Highly hydrophobic insulation self recovery
- High anti-aging property
- Low leakage current
- Reliable resistance to cracking and corrosion
- Excellent resistance to thermal aging

The hydrophobic epoxy resin material (HCEP) has excellent hydrophobic mobility, hydrophobic recovery and resistance to thermal degradation. The test shows that the HCEP can restore the hydrophobicity quickly after losing it and has strong persistence. In contrast, the hydrophobicity modified by directly adding other materials to the ordinary CEP material is not persistent enough. The mechanical property and electrical property of HCEP are comparable with those of CEP, and the high resistance to thermal degradation is a great improvement

Professionally designed and produced high-quality permanent magnetic mechanism control system

- Microcomputer control system, with precise and stable opening and closing time characteristics
- Precise and constant opening and closing drive current
- Automatically remove the mutual inductance of coil, and keep the opening and closing speed stable and reliable, with low energy consumption of system
- Military level electronic components, and reliable operation temperature of -40°C~40°C

Edison™ series CES-40.5 Product design standard

Product design standard

IEC 62271-100:2008	High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers
IEC 62271-1:2007	High-voltage switchgear and controlgear – Part 1: Common specifications
GB1984-2003	High voltage AC circuit-breakers
GB/T11022-2011	High-voltage switchgear and controlgear: Common specifications
DL/T402-2007	Specification of high-voltage alternating-current circuit-breakers
DL/T403-2000	HV vacuum circuit-breaker for rated voltage 12kV to 40.5kV
JB/T3855-2008	3.6~40.5kV indoor AC High voltage vacuum circuit-breakers
JB/T8738-2008	3.6~40.5kV Vacuum interrupter for AC high voltage switchgear and controlgear
GB13540-2008	Seismic requirement of AC high voltage switchgear and controlgear's

Type test

- Insulation test
- Temperature rise test
- Short-time withstand current and peak withstand current tests
- Mechanical operation test at ambient air temperature
- Making and breaking tests at short-circuit current
- Capacitive current switching tests


检验（试验）报告
Test Report

Environmental management system

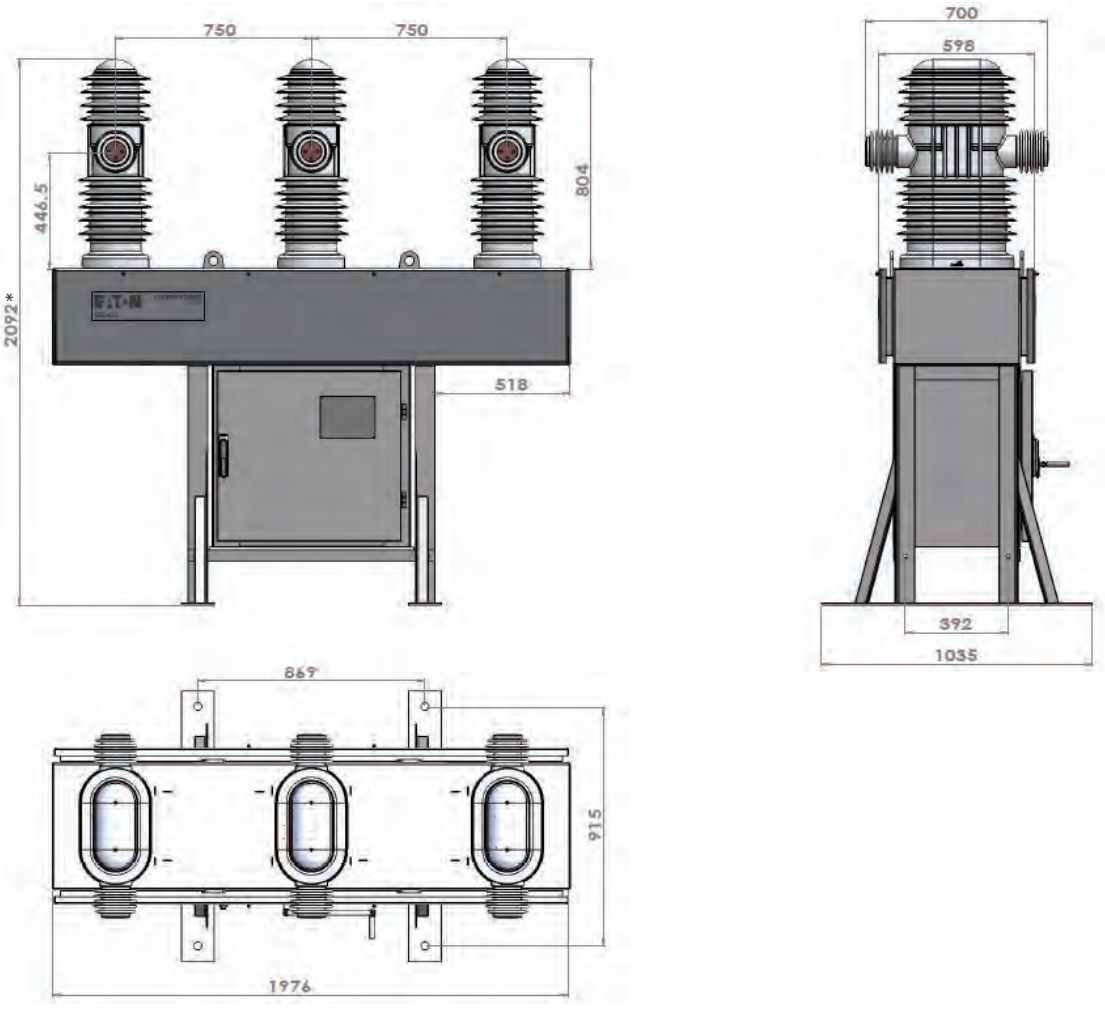
- CES-40.5 Series breaker strictly follow the ISO14001:2004
- environmental management system standard and rules which is
- authorized by third separately authority organization
- Products manufacture process follow the requirement of
- Environmental management system about the energy consume,
- raw material consume, rubbish recycle and so on to protect the environment.

CES-40.5 Technical parameter

Performance parameter

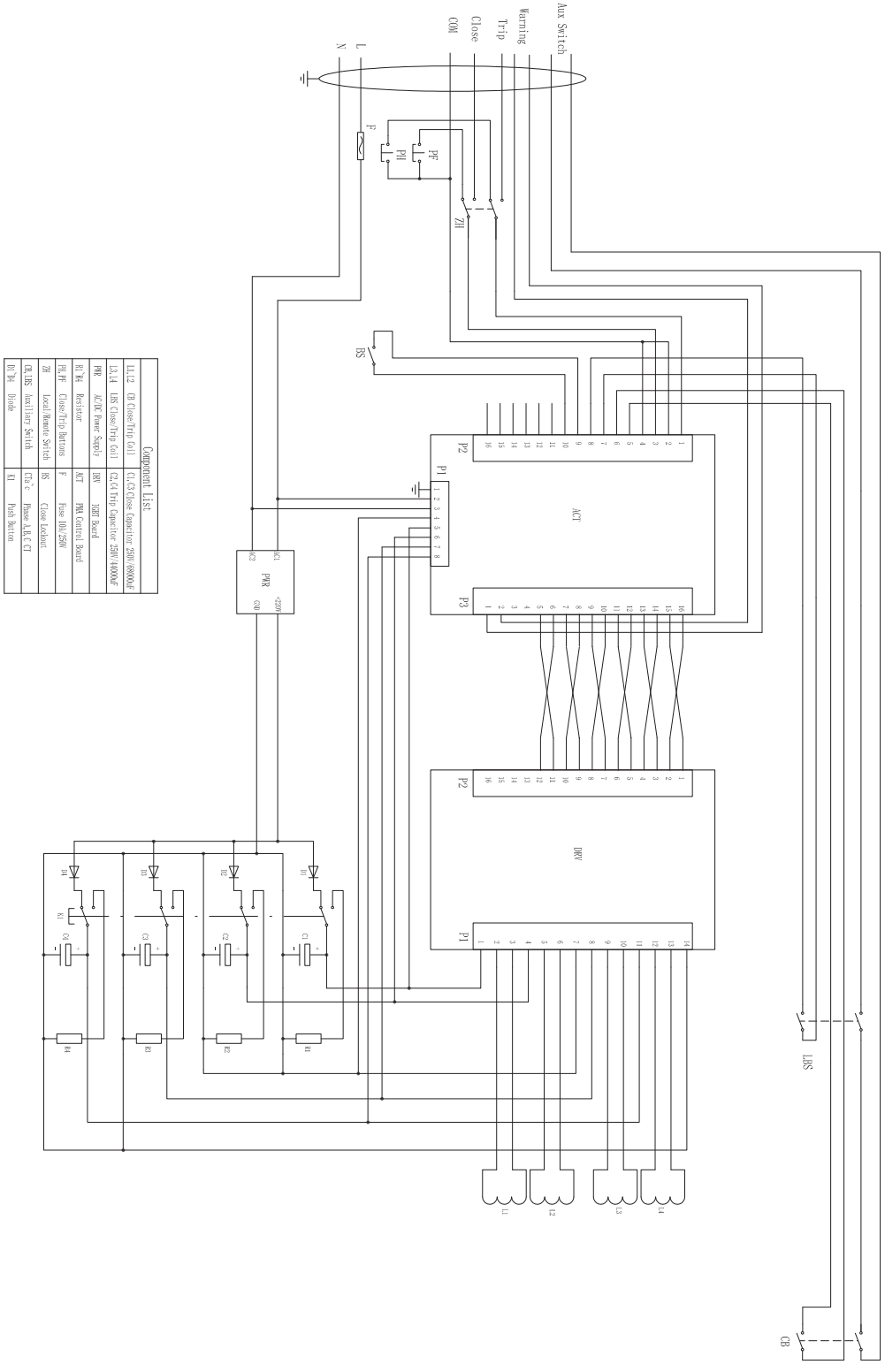
Rated voltage	kV	40.5
Power frequency withstand test	kV	95/118
Rated lightning impulse withstand voltage	kV	185/215
Rated voltage of the control voltage	V	AC220/110, DC220/110
Withstand voltage of control voltage (1 min)	V	2000
Rated frequency	Hz	50/60
Rated current	A	1250, 1600, 2000, 2500
Rated short circuit current	kA	25, 31.5
DC component percent		50%
Rated short circuit making current(peak)	kA	63, 80
Rated short-time withstand current(4s)	kA	25, 31.5
Rated peak withstand current	kA	63, 80
Rated back to back capacitor break current	A	1500
Rated capacitor making inrush current	kA	20
Mechanical life time	cycles	30000
Electrical life time	class	E2
Breaking times at short circuit current	cycles	30
Pollution class	class	IV
Ambition temperature		-40°C~+40°C
IP class	class	IP54
Seismic class	class	9
Ice coating thickness	mm	10

Outline dimension



* the dimension can be modified by customer's requirements.

CES-40.5 Electrical design drawing



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Printed in China
March 2015

Powering Business Worldwide