

# Medium Voltage Metal Enclosed Capacitor Bank Typical Reference

3~40.5kV Metal Enclosed Capacitor Bank  
Typical Reference



*Powering Business Worldwide*

# The brand and business introduction of Eaton Cooper

## Eaton Corporation

Eaton Corporation plc is an international commercial energy provider with a total of about 100,000 employees worldwide. In 2021, the sales revenue is 19.6 billion US dollars, of which about 70% comes from the electrical business, and the other 30% comes from the industrial business (vehicle, aerospace, etc.). Eaton Electric With a full product line of power generation-transmission-distribution, it supports the excellent operation of the entire power system.

## Eaton Electric

The predecessor of Eaton Power Distribution was the American Westinghouse Company. In 1945, Westinghouse Electric Company signed an agreement with the China Resources Commission to arrange for more than 70 Chinese scientific and technological personnel to study and train, including Chinese power engineering meritorious specialist Chu Yinghuang, Ding Shunian and others. Many of them later became the backbone of China's power development.

## Eaton Industries

Eaton's hybrid system city buses travel in more than 100 cities in China, and the mileage has exceeded the milestone of 1 billion kilometers; Eaton's aerospace division is responsible for providing hydraulic, fuel, and environmental control system equipment for aircraft C919 and ARJ21 of The Commercial Aircraft Corporation of China, Ltd (COMAC). and won the COMAC's "Best Supplier" title.

## Cooper Industries

In 2012, Eaton fully acquired Cooper Industries for \$11.8 billion. Cooper is a global large-scale manufacturer of electrical and tool products. It was established in 1833 and is headquartered in Houston, USA. It is one of the top five companies listed on the New York Stock Exchange.





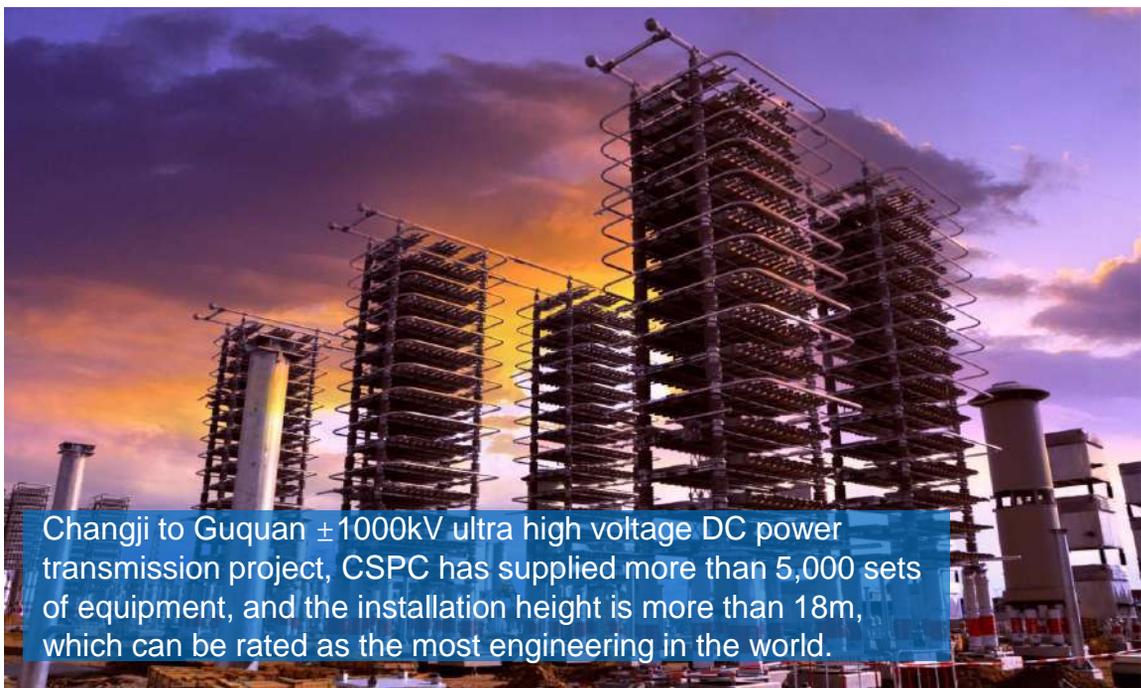
Cooper Power Capacitor is an important member of Eaton's power system. Cooper Power Capacitors have been in the leading position in the world since birth in 1946. About 800 employees in three factories around the world, with an annual production capacity about 55 million kvar, making it one of the largest suppliers of power capacitors in the world.

# The brand and business introduction of Eaton Cooper

## Eaton Cooper – The best performance in the world

Eaton's global business layout is divided into regional units such as the Americas, Asia Pacific, Europe, Africa and the Middle East. Eaton Cooper Shanghai Power Capacitor Co., Ltd. (CSPC) is established in 2004 to provide better services to all countries and regions in Asia Pacific. As Eaton Cooper's only production base for reactive power compensation and filter products in the Asia-Pacific region, CSPC is responsible for providing technical communication, quotation, production, testing, packaging, transportation and all related services of meet using requirement to support customer in the Asia-Pacific region.

Eaton Cooper (Shanghai) has made great achievements since its establishment in 2004. The company's strong technical strength has been highly recognized by State Grid Corporation of China. It is great honor as the manufacturer of reactive compensation and filter device of the world highest voltage class "Changji to Guquan  $\pm 1000\text{kV}$  ultra high voltage DC power transmission project". the engineering voltage is more than 2,700 times that of ordinary industrial electricity. Eaton Cooper has created many world "firsts", and jointly applied for core technology patent with the State Grid Corporation of China, was listed as "the first (set) of major technical equipment in the energy field" by The State Grid Corporation.



Changji to Guquan  $\pm 1000\text{kV}$  ultra high voltage DC power transmission project, CSPC has supplied more than 5,000 sets of equipment, and the installation height is more than 18m, which can be rated as the most engineering in the world.

# The brand and business introduction of Eaton Cooper

## Eaton Cooper – The best performance in the world

On July 28, 2020, the launch ceremony of the major project installation of the International Thermonuclear Experimental Reactor (ITER) program was held at the organization's headquarters in France. The launch ceremony marked the beginning of a new energy era. President of the People's Republic of China Xi Jinping sent a letter of congratulations, and the leaders of the 35 cooperative countries participated in the celebration through video. The project surpassed the International Space Station and became the world's largest and most far-reaching international scientific project. The plan achieves human-controlled nuclear fusion by imitating the Sun's nuclear fusion process, is affectionately called "artificial sun".

Eaton Cooper (Shanghai), with sufficient technical reserves and rich engineering operation experience, was finally recognized by the International Fusion Energy Program Execution Center and became the only supplier of power capacitors. Eaton has successively provided more than 3,000 units, filter and its complete set of equipment for this project. Specially, Eaton used a new type of environment friendly protection impregnant in this project, which has led the industry for 20 to 30 years.



Eaton Cooper became the only of power capacitors supplier of ITER program, has successively provided more than 3,000 units, filter and its complete set of equipment.



## 3~40.5kV Metal Enclosed Capacitor Bank

### Product Features

#### Structure Features

- Indoor / Outdoor Applications
- Solid structure, excellent Seismic
- Compact design enabling container shipping
- Automatic control, extendable



Indoor



Outdoor

#### Electrical Features

- Eaton capacitors ensuring reliable performance
- Verification studies and type test ensuring outstanding performance

#### Thermal Features

- Specialized cooling system with high power cooling fans and vents
- Patent technology enabling components with low loss and heat generated during operation

#### Product Parameters

- Voltage: 3~40.5kV
- Capacity: Up to 50,000kvar
- Protection: Unbalance Current, Open delta voltage
- Control: Manually / Automatically
- Switch: Vacuum contactor / Vacuum breaker

#### ■ Eaton MECB

Eaton's metal enclosed capacitor banks are designed to work in various of applications with metal enclosure, and at the same time work to its best ensuring electrical, thermal and mechanical performance.

#### ■ What a MECB can provide to power system?

- Reactive power compensation
- Enhance system stability
- Harmonic filter
- Voltage support



## Do You Know?

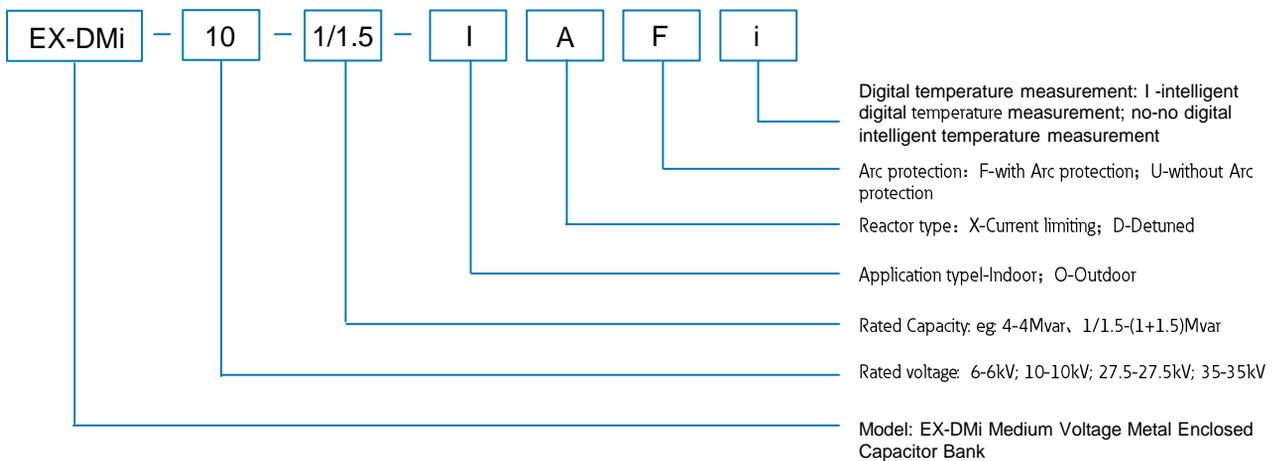
Eaton's Cooper Power Systems has more than 70 years experience improving power quality using capacitors.

# Eaton Cooper Type EX-DMi Medium Voltage Metal Enclosed Capacitor Bank

Eaton Cooper EX-DMi series medium-voltage capacitor metal enclosures, combined with Eaton's more than 70 years of experience in reactive power compensation and filtering industry, use Eaton's high-quality EX-7 power capacitors, also equipped with reactors, contactors/circuit breakers, lightning arresters, Current transformers, discharge coils, protection relay, power factor controllers, etc.

EX-DMi type medium voltage capacitor cabinet adopts industry-leading design, providing first-class quality and excellent service for power system and industrial users.

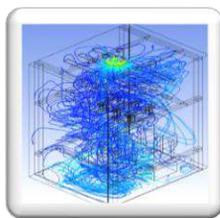
## Model Specifications for EX-DMi Medium Voltage Metal Enclosed Capacitor Bank



## Technical advantage



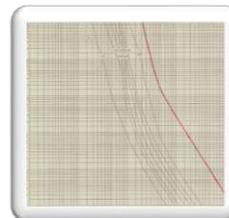
High-reliability frame and cabinet structure design, all structures have undergone finite element seismic verification



**Cool Plus** professional heat dissipation design, professional air duct simulation design



Eaton high quality vacuum circuit breaker and contactor capacitive breaking technology



**Cooper Bussmann** Current Limiting Fuses for Eaton High Quality Capacitors



100% aviation plugs are free of wiring on site, and 100% commissioning and testing in the factory

## Eaton Cooper Type EX-DMi Medium Voltage Metal Enclosed Capacitor Bank

### EX-DMi Medium Voltage Metal Enclosed Capacitor Bank

Item	Parameters
Rated voltage	3kV~40.5kV $\pm 10\%$
Frequency	50/60Hz
Output capacity	0.1~ $\pm 50$ Mvar/set
Switching method	Manual / Auto
Switching technology	Vacuum Capacitive Current Breaking Technology
Reactor Type	Current limiting pancake type、 iron core reactor、 Air core reactor
Impedance	0.1~1% current limiting type, 5~6% type, 12% type, or customized design
Protective function	Over-voltage, low-voltage, over-current, open-delta voltage protection, etc.
Power factor control	Automatic switching + intelligent life optimization + double busbar and double control realization
Communication protocol	Modbus RS485、 IEC61850
Application type	Indoor type IP2X, IP3X, IP4X, IP42; Outdoor type IP54, IP55
Fuse	Capacitor-specific current-limiting type, avoiding the crack of the capacitor case in a full range
Safe discharge	Triple protection: Discharge coil + capacitor series section resistance + capacitor bipolar resistance
Interlock	Five-Protection Interlock, mechanical lock optional
Package dimensions	A full range of containers can be transported
Operating temperature	-40°C~+55°C
Relative humidity	$\leq 90\%$
Altitude	$\leq 4000$ m
Seismic intensity	VIII level or higher
Digital function	Arc flash protection + digital temperature measurement + intelligent operation and maintenance assistant optional

**Remark:**

1 - The above are typical equipment parameters, please contact Eaton for specific supply configuration parameters.

2 - Product parameters are subject to change without notice.



### Project Information

- Application: Outdoor type
- Rating: 11kV – 3000kvar
- Product: Medium voltage capacitor Bank
- Project Location: New Zealand
- Project Type: Wind Farm
- Year: 2011
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



## Reference Record



### Project Information

- Application: Indoor type
- Rating: 6.6kV – 335+335+335kvar \* 2sets  
6.6kV – 100+150kvar \* 4sets
- Product: Medium voltage capacitor Bank
- Project Location: Philippines
- Project Type/Info: DCS Filinvest Northgate
- Year: 2016
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



## Reference Record



### Project Information

- Application: Indoor type
- Rating: 3.3kV – 85kvar \* 3sets  
6.6kV – 900kvar \* 5sets  
7.2kV – 930kvar \* 8sets  
11kV – 636kvar \* 2sets  
11kV – 310kvar \* 4sets
- Product: Medium voltage capacitor Bank
- Project Location: Hong Kong, China
- Project Type: Water Supply Department
- Year: 2011~2019
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.

## Reference Record



### Project Information

- Application: Outdoor type
- Rating: 13.2kV – 300+1400+1500kvar  
13.2kV – 1800+2100\*2+2000\*3kvar
- Product: Medium voltage capacitor Bank
- Project Location: Chile
- Project Type/Info: Altonorte Metallurgical Complex
- Year: 2017
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.





### Project Information

- Application: Outdoor type
- Rating: 11kV – 200+400+900+1000kvar \* 2sets  
11kV – 200+400+600kvar \* 2sets  
11kV – 200+400+400+600kvar \* 2sets  
11kV – 150+200+400kvar \* 2sets  
11kV – 300+600kvar \* 2sets
- Product: Medium voltage capacitor Bank
- Project Location: Malaysia
- Project Type: Petronas, Rapid, P2/P12B/P30 Project
- Year: 2016~2019
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



## Reference Record



### Project Information

- Application: Indoor type
- Rating: 10kV – 200+200kvar \* 4sets  
10kV – 200+300kvar \* 4sets  
10kV – 400+400kvar \* 3sets  
10kV – 400+800kvar \* 4sets  
10kV – 600+900kvar \* 6sets
- Product: Medium voltage capacitor Bank
- Project Location: Yunnan, China
- Project Type/Info: China Petroleum Zhongtian Hechuang
- Year: 2015
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.

## Reference Record



### Project Information

- Application: Indoor type
- Rating: 10kV – 100+150+200kvar, 2sets  
10kV – 250+250+400kvar, 2sets  
10kV – 300+300+600kvar, 2sets  
10kV – 1000+1500+1500kvar, 4sets
- Product: Medium voltage capacitor Bank
- Project Location: Kazakhstan
- Project Type/Info: KPI Integrated Petrochemical Complex
- Year: 2019
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



## Reference Record



### Project Information

- Application: Indoor type
- Rating: 10kV – 1000kvar, 5sets
- Product: Medium voltage capacitor Bank
- Project Location: Shenzhen, China
- Project Type/Info: Yonghu Water Supply Department
- Year: 2020
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



### Project Information

- Application: Indoor type
- Rating: 10kV – 500\* 2sets
  - 10kV – 800kvar \* 2sets
  - 10kV – 1334+1334+1334kvar \* 2sets
  - 10kV – 500+500kvar \* 4sets
  - 10kV – 1000+1000+1000kvar \* 2sets
  - 10kV - 1334+1334+1334kvar \*4sets
  - 10kV – 1250+1250+1250+1250 \* 2sets
  - 10kV – 1000+1000kvar \* 4sets
  - 10kV – 800+800kvar \* 10sets
- Product: Medium voltage capacitor Bank
- Project Location: Shannxi, China
- Project Type: Shanbei Yulin Chemical
- Year: 2020
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.

## Reference Record

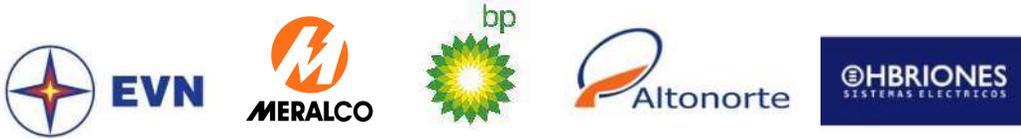


### Project Information

- Application: Outdoor type
- Rating: 22kV – 3000kvar \* 6 steps
- Product: Medium voltage capacitor Bank
- Project Location: SAN Migule, Philippines
- Project Type/Info: Renewable Energy - Solar Plant
- Year: 2020
- Manufacturer: Eaton's Cooper Shanghai Power Capacitor Co., Ltd.



## MV Capacitor Bank - Typical customers



Eaton  
Electrical Sector, APAC  
Power Distribution and System Service  
Reactive Compensation and Harmonic Filter

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