Metal Enclosed Capacitor Bank: ABBACUS D-Series
Enhancing power quality and energy efficiency of your electrical network

Power quality is a major concern for transmission and distribution utilities, industries, and transport and infrastructure sectors. Poor power quality affects grid reliability, productivity, leads to higher operating costs and penalties for non-compliance with grid codes.

ABB is a technology leader with a wide range of products, systems and services that improve power quality across the power value chain for low, medium and high-voltage applications, helping to shape a stronger, smarter and greener grid.

ABB’s ABBACUS range of metal enclosed capacitor banks (MECB) are a ‘one stop shop’ solution for maintaining power quality in medium voltage networks by compensating reactive power, improving power factor or by passively mitigating harmonics.

ABB’s ABBACUS D-Series MECB provides a comprehensive reactive power solution combining primary components with secondary control and protection in a compact modular enclosure. The system can be configured as a fixed or switched solution, with the switched bank consisting of single or multiple steps, which can be automatically controlled to improve power factor. To provide maximum system benefit the bank can be configured with detuning, or simple inrush reactors. For more advanced applications a tailored filter solution can be designed. The ABBACUS D-Series is available in a range of configurations suitable for voltage applications up to 12 kV. It is fully assembled and factory tested.

The unique modular design of the ABBACUS D-Series MECB provides a solution suitable for electrical distribution utilities and large industrial power users including mining, pulp and paper, chemical, petrochemical, wind and solar farms.
Components of ABBACUS D-Series MECB

**Incomer module**
- Incoming cable termination busbars
- Isolator/earth switch
- Surge arresters
- Circuit breakers
- Protection voltage transformers
- Line current transformers
- Live line indication

**Power module**
- Capacitors
- Inrush, detuning or filter reactors
- HRC fuses
- Contactors
- Pressure switches
- Earthing stick
- Safety interlocks
- Lights
- Heaters
- Cooling fans
- Thermostats

**Arc fault mitigation technology Q-ACT**
ABB’s ABBACUS D-Series MECB is also available with the latest innovation in arc fault mitigation technology.

The type tested protection system utilises advanced sensing and tripping relays in conjunction with a sophisticated fibre optic network to detect and extinguish an arc before any damage can occur.

Using ABB’s Ultra-Fast Earthing Switch (UFES) device, arc extinction occurs in less than four milliseconds leaving the metal enclosed capacitor bank and its components completely undamaged and operational after an arc fault.

**DS1 capacitor switch**
In operations where sensitive loads are present, ABB’s DS1 capacitor switch can be included to allow for transient free switching. Utilising diode based switching technology, the DS1 can perform bank opening and closing operations without any transient current or voltage, and completely eliminates any possibility of restrike.
The design allows compensation to be connected at different points in the network and offers different configurations for reactive power compensation and harmonic mitigation:

1. Central compensation on MV side.
2. Central compensation on MV/LV side.
4. Individual compensation.

**Central compensation**
When the main purpose is to reduce reactive power purchased, e.g. to minimize energy bills due to ... etc.

**Group compensation**
Group compensation can be applied when a concentrated group of loads needs to be or can be compensated. This compensation type reduces load on the upstream cables/ transformers thereby decreasing energy losses.

**Individual compensation**
With this compensation type, individual loads (e.g. motors) are compensated. The special advantage with individual compensation is that existing switching and protective devices for the machine to be compensated can also be utilised for switching and protection of the capacitors. In addition, the upstream cables or transformers are offloaded maximally, resulting in maximum reduction in network losses.
**Technical data**

**General**
- **Voltage**: Up to 12 kV
- **Maximum output**: 2.5 Mvar/module, 15 Mvar total (6 steps)
- **Frequency**: 50 or 60 Hz
- **Location**: Indoor or outdoor
- **Ambient temperature**: –10/ +50°C
- **Altitude**: <1000 m above sea level
- **Humidity**: Maximum 90% RH non-condensing
- **Insulation level**: Up to 125 kV BIL
- **Short circuit current**: Up to 50 kA for 1 second
- **Bank configuration**: Fixed, switched single or multi-step
- **Interlocking (optional)**: Mechanical or solenoid
- **Arc fault mitigation**: ABB Q-ACT (optional) with full incomer
- **Busbar**: Hard drawn copper (tinned)
- **Standards**: IEC, IEEE/ ANSI, CSA or equivalent

**Enclosure**
- **Material**: Mild steel
- **Base frame**: Hot dipped galvanized steel
- **Protection**: Up to IP54 indoor/ outdoor
- **Door locking**: Three point padlock handle with interlock option
- **Installation**: Base fixing
- **Handling**: Fork and crane lifting via base
- **Cable entry**: Bottom only

**Capacitors**
- **Type**: Single, three or split-phase
- **Fusing**: Internal or unfused
- **Discharge resistor**: Built-in
- **Losses**: <0.15 W/ kvar including resistors
- **Dielectric**: Polypropylene film
- **Container**: Stainless steel
- **Bushings**: Grey porcelain, one, two or three

**Inrush reactors**
- **Type**: Single phase, air core

**Detuning / Filter reactors**
- **Type**: Three phase, iron core

**Contactors**
- **Type**: Vacuum contactor
- **Phase**: Three
- **Current rating**: 250 Amps capacitive

**Isolator and earth switch**
- **Type**: Air-insulated
- **Phase**: Three
- **Current rating**: 1250 A

**Fuses**
- **Rated current**: Up to 315 A
- **Short time current**: 63 kA (max)

**Power factor controller**
- **Microprocessor-based system for single or three phase system**: Insensitive to harmonics
- **Control voltage**: 100 VAC to 240 VAC
- **Power factor setting**: 0.7 inductive to 0.7 capacitive

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1 Higher ratings available on request
2 Lower ratings available on request

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For more information please contact your local ABB representative or visit [abb.com/powerquality](http://abb.com/powerquality)

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