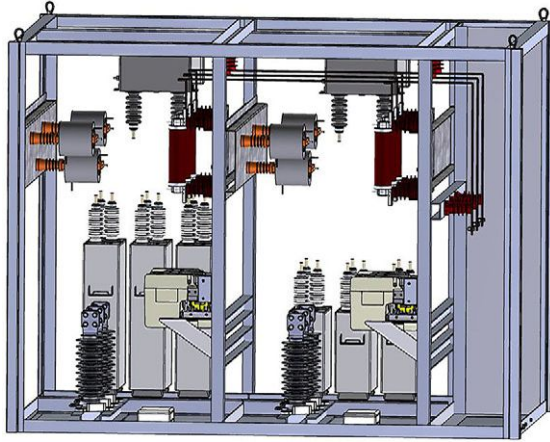


## High Voltage AC Power Capacitors Metal Enclosed Capacitor Banks (MECB)



### FEATURES

- Fixed or switched type
- Modular design
- Cabinet protection class up to IP55
- Enclosed design providing full protection of live parts

### APPLICATIONS

- Power factor correction
- Filter circuit systems
- Individual or group compensation
- Harmonic filtering
- Industrial converter
- Thermal power station
- Solar
- Wind

| QUICK REFERENCE DATA |   |
|----------------------|---|
| Series               | C/... HVAC MECB                             |
| Description          | MECB, indoor or outdoor                     |
| Type                 | Fixed or switched                           |
| Technology           | Metal enclosed power modules, air insulated |
| Voltage min. (V)     | 1000  |
| Voltage max. (V)     | 36 000                                      |
| Frequency min. (Hz)  | 50  |
| Frequency max. (Hz)  | 60  |
| Output min. (kvar)   | 150   |
| Output max. (kvar)   | 20 000                                      |

| TECHNICAL DATA                                     |   |
|--|---|
| Rated frequency                                    | 50 Hz or 60 Hz (other frequencies on request)   |
| Insulation class                                   | 3.6 kV to 36 kV   |
| Internal connection                                | 1-phase or 3-phase  |
| Temperature category                               | -50 °C to +55 °C  |
| Protection   | HRC fuses, unbalance / overheat / overpressure protection   |
| Cabinet material                                   | Aluminum / stainless steel available upon request   |
| Cooling system                                     | Forced ventilation or natural convection  |
| Standards  | IEC / other standards upon request  |
| Capacitor bushings                                 | Porcelain, screw and welded type, M12 / M16   |
| Casing   | Aluminum / stainless steel available upon request   |
| Standard color                                     | Non-painted / colors for stainless steel cabinet available upon request   |
| Additional equipment for protection <sup>(1)</sup> | Reactors - quick discharge reactors, damping reactors, detuned reactors; vacuum contactors, SF6 circuit breakers, earthing switches, surge arresters, unbalance protection relays, thermostat |

**Note**

<sup>(1)</sup> Can be installed inside the cabinet according to the customer requirement

**ADDITIONAL EQUIPMENT FOR PROTECTION**

In addition to the protection devices specific to each capacitor type, namely internal fuses or pressure switches, other accessories have to be used and incorporated into the capacitor bank:

**HRC FUSES**

Protection using HRC fuses integrated in the capacitor bank is ideal from the technical and economical point a view. The rating of the HRC fuse will be selected to have a value between 1.7 and 2.2 times nominal current of the capacitor bank. Short circuit current inside the capacitor is usually main reason that fuse blows.

**PRESSURE SWITCH**

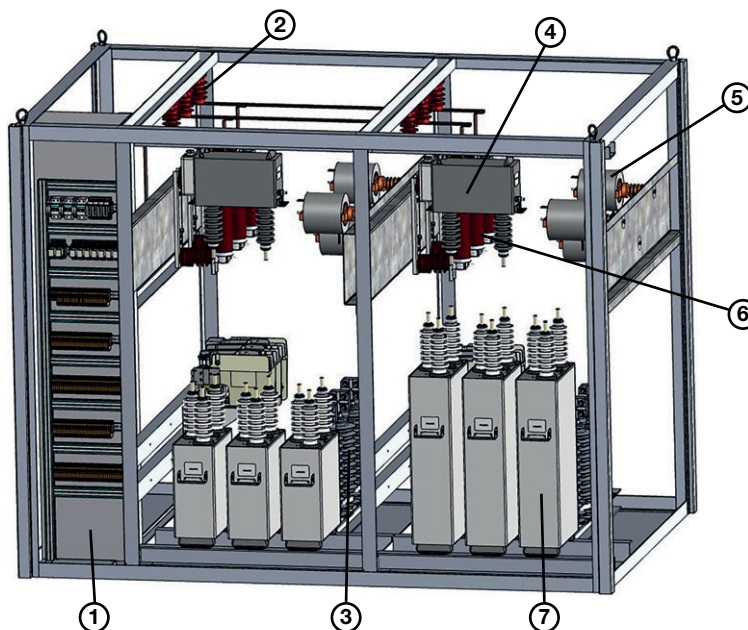
With the pressure sensor is the internal pressure being monitored in a capacitor. If the stipulated limiting value is exceeded, a signal contact (change-over contact) initiates the disconnection of the electrical supply to the capacitor. Such an early disconnection from the source of supply, after an internal breakdown, can stop the gas evolution in the capacitor before the casing bursts.

**UNBALANCE OR DIFFERENTIAL PROTECTION**

This type of bank protection is usually applied for applications above 12 kV and reactive power above 1000 kvar. It consists of a current transformer connected between two electrically balanced points combined with the current relay. In the event of a failure, i.e., element breakdown or group short-circuit, the star point of the respective branch is shifted and causes a current flow between the star points.

**FORMS OF CONSTRUCTION** (Example)

1-phase capacitor units



**List of equipment:**

- 1. Auxiliary compartment
- 2. Support insulator
- 3. Surge arrester
- 4. Unbalance current transformer
- 5. Inrush current reactor
- 6. Protection fuse
- 7. Capacitor unit

**QUICK DISCHARGE REACTORS**

Installation of two quick discharge reactors between the phases of capacitor bank will reduce capacitor discharge time from 10 minutes to approximately 10 seconds. To ensure correct cooling of the reactors it is necessary to take 30 minutes time after which the next discharging of the capacitor units can take place.

**DAMPING REACTORS**

Installation of the 1-phase damping reactors in series on each phase makes it possible to reduce switching current value (inrush current) which will secure efficient protection of capacitor units.

**DETUNED REACTORS**

The only effective protection against the high level of harmonic that can be present in the network is by installing usually 3-phase detuned reactors in series with the capacitor units. Detuned reactor will increase impedance of the capacitor units to the harmonic currents and will also perform the function of a damping reactor.

**CONTACTOR**

Contactors are designed to switch capacitive currents and are generally of vacuum type. The device must always be used with three damping reactors or a detuned reactor in order to damp the inrush currents.



| TYPE NOMENCLATURE                  |                      |  |                   |   |                                       |  |   |                                  |                                |         |   |
|------------------------------------|----------------------|--|-------------------|---|---------------------------------------|--|---|----------------------------------|--------------------------------|---------|---|
| C                                  | 4.16                 | 100 + 200  | 50                | D   | L                                     | LD                                     | QD  | HH                               | CB                             | S       | 6 %   |
| 1                                  | 2                    | 3  | 4                 | 5   | 6                                     | 7                                      | 8   | 9                                | 10                             | 11      | 12  |
| 1                                  | 2                    | 3  | 4                 | 5   | 6                                     | 7                                      | 8   | 9                                | 10                             | 11      | 12  |
| Capacitance<br>(capacitor<br>bank) | Voltage<br>(V or kV) | Total<br>output<br>in steps<br>(kvar or<br>Mvar) | Frequency<br>(Hz) | Pressure switch,<br>n.E.<br>unbalance<br>protection | Filter<br>reactor,<br>n.E.<br>without | Damping<br>reactor,<br>n.E.<br>without | Quick<br>discharge<br>reactor,<br>n.E.<br>without | HRC<br>fuses,<br>n.E.<br>without | Contacting,<br>n.E.<br>without | Cabinet | Detuned<br>factor,<br>n.E.<br>not a<br>filter |

**Note**

- n. E. = no entry



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