

### 1 - DESCRIPTION

Any non-linear loads like:

- Non power factor corrected fluorescent and HID lighting fixture ballasts (40-80% p.f.)
- Arc welders (50-70% pf)
- Solenoids (20-50% pf)
- Induction heating equipment (60-90% pf)
- Small “dry-pack” transformers (30-95% pf)
- Induction motors (55-90%) etc.

can cause poor power factor. In many areas electricity boards imposes a penalty charge for low power factor (pf). A poor power factor due to an inductive load can be improved by addition of capacitors in shunt. Awareness of necessity of power factor quality is increasing. Enhancing power quality i.e improvement of power factor saves cost and ensures a rapid return on investments.



Installing **“MAX” APFC Panels** provides a reliable solution for elimination of penalties and a cost reduction in the electricity bills by approximately 25%. This panel offers designs that are suitable for indoor or outdoor use. They are designed to minimize installation time and cost and offers high reliability, long life and is suitable for operation over a temperature range of -10 C to 50 C. A wide range of ratings with standard devices are available.

### 3 – BEST SUITABLE FOR

This APFC panel is best suitable for

- Installations having thyristorised loads
- Municipal water pumping schemes
- Lift irrigation schemes
- DoT, Railways, CPWD requirement
- Upto 20% harmonic distortions
- 50 % over current
- 20 % over voltages

### 4 - SAFETY FEATURES

- HRC fuses back-up protection
- Safety door interlock to prevent door from being opened while panel is “ON”
- Each capacitor is provided with an internal discharge resistor

### Panel Inner View



Front View

Back View

### 2 - TECHNICAL FEATURES

|                          |                   |
|--------------------------|-------------------|
| Dimensions:              | (L x W x H) mm    |
| 35 – 70 kVAr             | 800 x 400 x 100   |
| 300 kVAr                 | 1000 x 800 x 2000 |
| 400 kVAr                 | 1650 x 800 x 1800 |
| Supply                   | 3 Phase, 4 Wire   |
| Rated Voltage            | 415 V / 440 V     |
| Rated frequency          | 50 Hz.            |
| Permissible Over Voltage | 1.1 Vn            |
| Permissible Over Current | 1.3 line Current  |
| Temperature Category     | 50° C             |

|   |  |
|---|--|
| <p><b>5 - SALIENT FEATURES</b></p> <ul style="list-style-type: none"> <li>• User friendly <b>Microprocessor based APFC Relay</b> having following characteristics: <ul style="list-style-type: none"> <li>○ Intelligent control</li> <li>○ Menu driven handling</li> <li>○ Self-optimizing control capability</li> <li>○ Large measuring voltage range</li> <li>○ Recall function of recorded values</li> <li>○ Four-quadrant operation (e.g. stand by generator)</li> <li>○ Powerful alarm output</li> </ul> </li> </ul> | <p>System parameters displayed –</p> <ul style="list-style-type: none"> <li>Ø System voltage (VAC)</li> <li>Ø Reactive power (kvar)</li> <li>Ø Active power (kW)</li> <li>Ø Frequency</li> <li>Ø THD-V, THD-I</li> <li>Ø Apparent power (kVA)</li> <li>Ø Apparent current (A)</li> <li>Ø Temperature (°C)</li> <li>Ø Real-time cos</li> </ul> <p>~</p> <ul style="list-style-type: none"> <li>• Current limiting contactors / Thyristors especially designed for capacitor switching</li> <li>• Load manager and data logger can also be provided in addition to downloading data</li> <li>• Provision for top and bottom cable entry</li> <li>• Aesthetically designed dust proof cabinet with powder coating</li> <li>• Cooling fan for efficient performance</li> <li>• Completely wired and tested in works and supplied with all control and safety devices.</li> </ul> |
| <p><b>6 - Technical data</b></p>  | <p><b>Automatic power factor correction unit</b></p>   |
| <p>Mechanical structure</p>   | <p>sheet steel, protected against corrosion by a Phosphating treatment. Structure powder painted, IS631 Siemens grey colour (other colours on request)<br/>External Protection Degree: IP45</p>  |
| <p>Wiring</p>   | <p>Flame retardant cables. Aux. circuits are identified as in the electrical drawing</p>   |
| <p>Fuses</p>  | <p>All capacitors is protected by a set of three fuses with high breaking capacity. Also the auxiliary circuits are protected by fuses.</p>  |
| <p>Rated Voltage</p>  | <p>415 Vac</p>   |
| <p>Frequency</p>  | <p>50 Hz.</p>  |
| <p>Auxiliary voltage</p>  | <p>230 Vac</p>   |
| <p>Mains voltage</p>  | <p>415 Vac three phase</p>   |
| <p>Contactors</p>   | <p>Each bank of capacitors is controlled by a three-pole contactor. To limit the inrush current peaks, each contactor is provided with insertion resistors.</p>  |
| <p>Thyristors</p>   | <p>Thyristor switching at zero crossing, instantaneous ON &amp; 40 sec delay required for same capacitor to be switched ON again.</p>  |
| <p>Capacitors</p>   | <p>Self-healing Metallized Polypropylene equipped with overpressure safety device and discharge resistor. Filling: biodegradable non toxic dry type, PCB free. Capacitance tolerance: - 5% to + 10%, Dielectric losses: &lt;0.2W/kvar</p>  |
| <p>Protection degree</p>  | <p>External protection rating : IP 45</p>  |
| <p>Power supply</p>   | <p>Provision for top and bottom cable entry</p>  |
| <p>Cooling</p>  | <p>Exhaust fans</p>  |
| <p>Temperature class</p>  | <p>-10° C to + 50° C</p>   |
| <p>Power factor controller</p>  | <p>Friendly user intelligent Microprocessor based APFC Relay</p>   |
| <p>Reference Standards</p>  | <p>IS 13585 (Part I); 1994</p>   |

## 7 – SCHEMATIC WIRING DRAWING

415 V, 3 PHASE, 50 HZ

AC, INCOMING SUPPLY

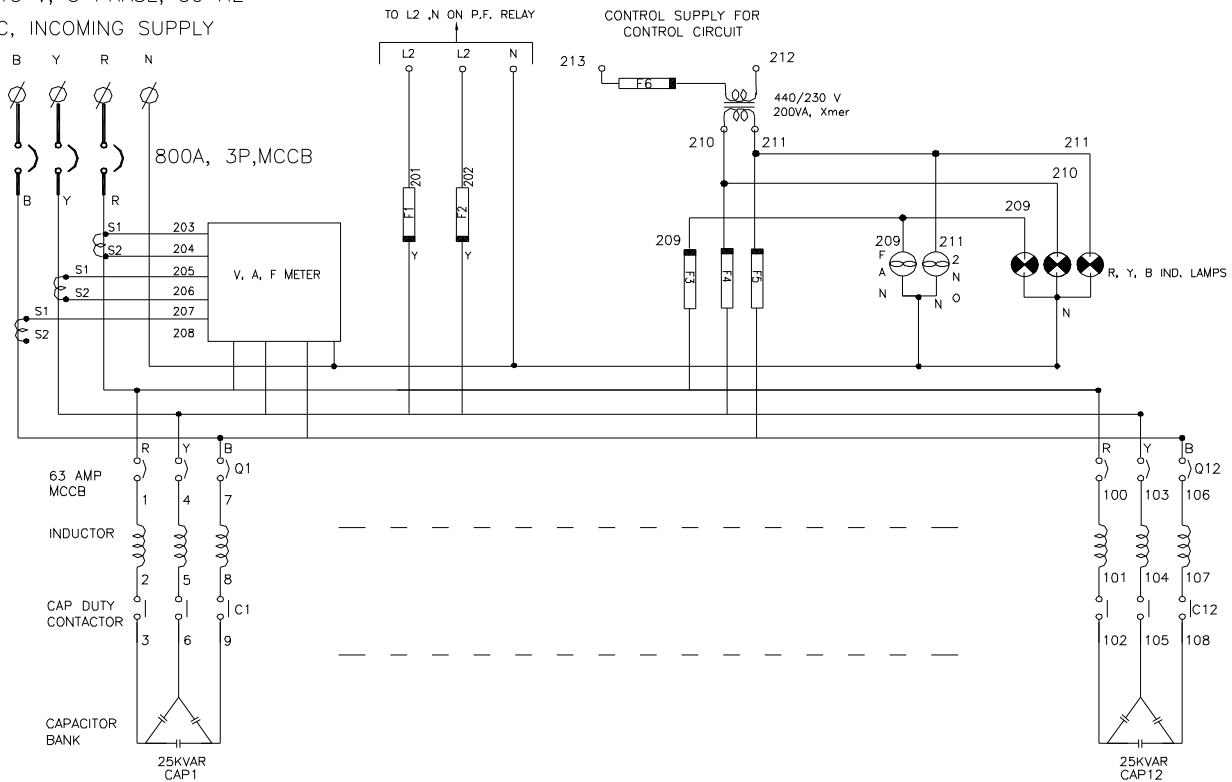


Fig A: Contactor Switched Panel

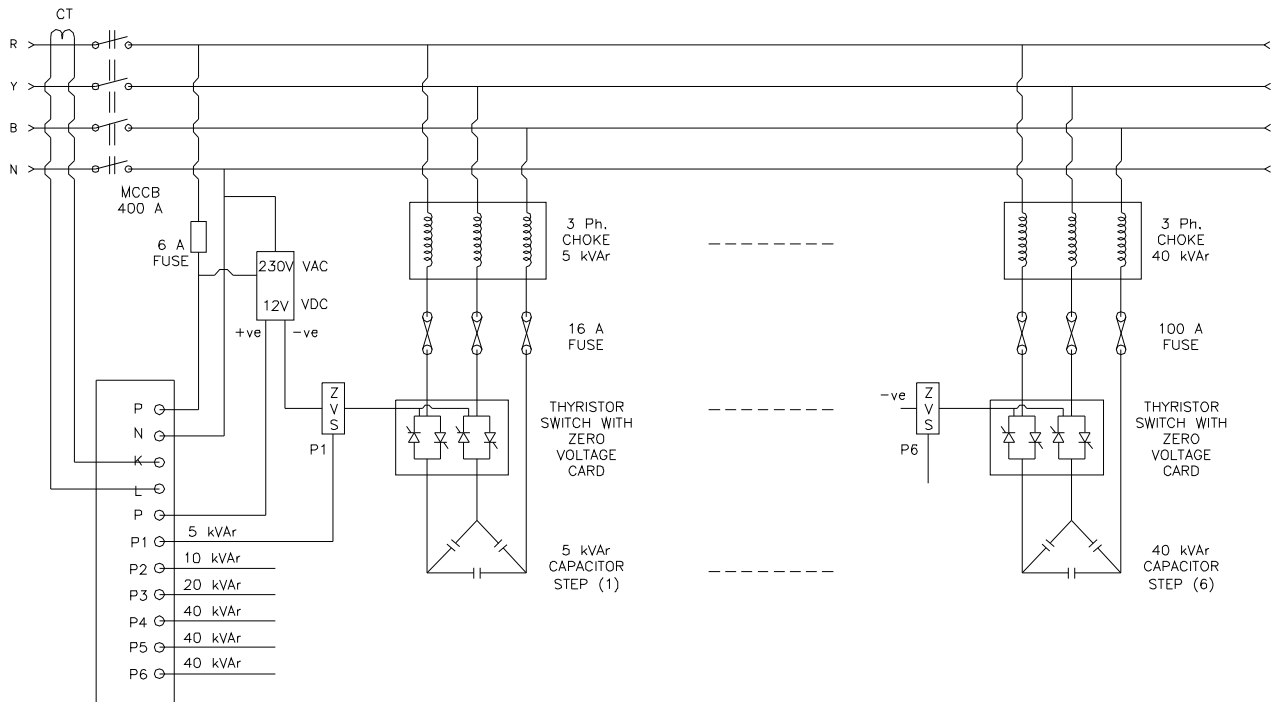


Fig A: Thyristor Switched Panel